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Editorial.

FOUR years have now elapsed since the first number of this JOURNAL was issued, and its promoters may well congratulate themselves on the assured position it has succeeded in achieving. Already, (vol. v., Feb. 1904, p. 117), well-deserved testimony has been borne to the "ability, experience and literary aptitude" of Mr. Doran, who, as its first Editor, guided the fortunes of the JOURNAL during the most perilous period of its life. A tribute no less emphatic is due to his successor. As assistant Editor, Dr. Eden had from the beginning taken a very active part in the management of the JOURNAL, so that when, on Mr. Doran's resignation two years ago, he was appointed to succeed him as Editor-in-chief, he entered upon his duties with an experience of the work that was invaluable. How well he has performed those duties, all readers of the JOURNAL know. It was with a feeling, indeed, akin to dismay that the Editorial Committee received the announcement of his wish to retire. Having assured themselves, however, that his decision was final, they could but regretfully accept the resignation, expressing at the same time their grateful sense of the value of the services he has rendered to the JOURNAL and, through it, to British Obstetrics and Gynæcology.

The new Editor would have hesitated to undertake the duties had he not been promised the cordial co-operation not only of the present assistant Editor but of the entire acting staff. He enters upon his task with an earnest desire to maintain the JOURNAL at its present high standard, and he trusts that it will continue to be regarded as the recognised medium of publication for workers in Obstetrics and Gynæcology throughout the whole of the British Empire. To this

end he entreats all who are actively devoting themselves to either or both of these branches of medicine to assist him in endeavouring to promote the interests of the JOURNAL, not only by enrolling themselves as subscribers, and inducing others to subscribe, but by enriching its pages from time to time with their own contributions.

With regard to the general arrangement and scope of the JOURNAL there is no intention of introducing any change. The "Review of Current Literature" will still constitute an important feature. Fortunately the excellence of this department is guaranteed, the able and energetic workers who have so generously prepared the Abstracts hitherto, having expressed their willingness to continue their useful and unselfish labours.

Ventral Fixation of the Uterus and its Alternatives: Remarks Introductory to a Discussion.*

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I have undertaken to open this discussion because the Secretaries asked me to do so, not because I have any novelty to bring forward. The operation has now become one frequently performed, but its proper place among therapeutic agencies has never been discussed in this Society. Therefore it seemed to the Secretaries, and I agreed with them, that it would be a good thing that it should be the subject of discussion.

It seems to me to be unnecessary to discuss whether ventral fixation will remove the symptoms caused by retroflexion of the uterus. Everyone who has had any experience of the operation knows that it will. The question is not whether ventral fixation is effective, but whether in every case it is the best thing.

It is so simple an operation than when performed upon a freely movable uterus it ought to have no mortality. The mortality that it has had comes either from the accidents that will happen when safety depends upon human agency; or from the presence of some complicating condition.

I shall not discuss in detail the methods of performing the operation.

The subject upon which I put before you my opinions, which I hope may elicit valuable results of the experience of others, is the place of ventral fixation as a method of treatment.

Thirty years ago there were gynæcologists to be found who would attribute almost any symptom that a woman might complain of to a displacement; and would treat what they thought was a displacement with a pessary. At the present day we hear of places where it is taught that pessaries ought to be discarded. A learned Edinburgh gynæcologist recently wrote a paper in which he compared the opinions of different writers on diseases of women as to the use of pessaries; and having done this he went to the principal instrument maker's shop, and asked if there was any falling off in the demand for pessaries. He was told more and more were sold every year.

* Read before the Obstetrical Society of London, December 6th, 1905. For the discussion which followed, see "Reports of Societies" in this number.

This is the first question for discussion. In what cases should we advise patients not to wear a pessary, but to submit to surgical treatment instead?

(*a*) There are some cases in which the answer is easy. There are cases in which with retroflexion there is great tenderness of the body of the uterus, arising as I think from congestion of the body of the uterus owing to compression of the veins against strong and tense utero-sacral ligaments. In these cases the patient suffers continuously from sacral and hypogastric pain, and intermittently from painful menstruation and dyspareunia. These cases do not form a larger proportion than one-tenth of the cases in which the uterus is retroverted. In some of them no vaginal pessary will support the uterus in a position of anteversion, and unless this is done the patient is not relieved. In such cases I think surgical treatment ought to be advised. Although the ailment is not in any way dangerous, yet the constant pain is enough to spoil the patient's life, and it is well worth her while to submit to operation.

(*b*) There are cases which Mr. Lawson Tait in 1887 spoke of as "one of the most dreadful conditions that the gynæcologist has to deal with"—language perhaps a little exaggerated. These are cases in which the uterus is fixed by adhesions in a retroverted position, and is very tender. In such cases the patient is often practically an invalid, and pessaries are no sort of use. Ventral fixation is here the only treatment that offers any hope of success. But it is unwise to be in such cases too confident of cure: first because it is difficult to say whether the pain is due to the retroversion or to the condition of the pelvic peritoneum. Secondly, because such patients are often neurasthenic, and if the pain be of a neurasthenic kind, operation will not quickly cure it. Thirdly, because the presence of adhesions which have to be broken down and will bleed increases the danger of the operation.

(*c*) There are cases, the majority of cases of retroversion, in which the uterus although fallen backwards is not congested. The folds of peritoneum which bound Douglas's pouch are so shaped that they do not compress the veins by which the blood from the uterus is returned. The displacement only causes symptoms because it is associated with slight descent. There is sacral and lower abdominal bearing-down pain, and there is often irritation of bladder. These symptoms are not severe, but they keep the patient in constant discomfort. The uterus is not tender, and therefore the pressure of any kind of pessary is tolerated. In most cases a pessary will give nearly complete relief. In a few a pessary will give complete relief. In a few

others the state of the vagina is such that it is not possible to find a pessary that will stay in position.

When a pessary will give relief, either complete or practically complete—that is that the pain becomes only slight and occasional,—I think the patient should be advised to be content with the pessary. The only drawback to wearing a properly-fitting pessary is the necessity of going to a doctor every few months for examination and cleansing. In many cases after the pessary has been worn for two or three years, the patient is able to do without it; when she goes without it either the displacement does not return, or if it does, the symptoms do not; the years of support by the pessary have enabled the pelvic floor to regain its normal tone. Put against this the accompaniments of an operation: there is a little risk to life; certain possible remote risks, about which we know little—risks I mean of hernia, intestinal obstruction, etc;—in any case three weeks' confinement. I think these are more serious inflictions than a visit to a doctor three or four times a year.

But if a patient is in continual discomfort all the time she is standing, and mechanical support fails to relieve her, then I think it is proper to resort to surgery.

Yet we ought not to fly to surgery in these cases without remembering that there are means of support which can be used in the most lax vaginas: I mean the different kinds of pessary that are kept up by straps attached to a waist belt—Cutter's and the various forms of cup and stem pessary. Patients differ much in their degree of satisfaction with these supports. There are fastidious patients to whom the use of these pessaries is extremely repugnant. There are others who either do not object to them, or prefer them to an operation. Whether one of these pessaries should be worn seems to me entirely a question for the patient. But I think the medical man ought not to press surgery on this class of patient without mentioning that there are other means of relief.

Supposing now that it is settled that relief is to be given by an operation; the question is, what operation? In the class of case that I first described—that is, a uterus retroflexed and very tender without appreciable prolapse, there are three operations, any one of which will lift up the body of the uterus so that its veins are no longer pressed upon, and the patient's symptoms are at once relieved. These are ventral fixation, Alexander's operation, and vaginal fixation. If there is no prolapse, and the cause of suffering is the tenderness of the uterine body, these three operations are equally efficient in relieving the patient.

In the second class of cases, those in which the uterus is fixed in the position of retroversion by adhesions, there is no choice. Ventral fixation is the only efficient treatment. The round ligaments will not stand the pulling necessary to break down adhesions. Few persons possess fingers so long that they can hook them over the *fundus uteri* from the anterior vaginal fornix and break down adhesions behind it. The abdominal route is that by which the condition of the tubes and ovaries is best ascertained.

In the third class of cases, those in which there is no tenderness of the body of the uterus, the symptoms are those of descent, and operation is indicated because mechanical support is not satisfactory, there is also, in my opinion, no choice. Alexander's operation will not cure these cases. A weak, aching, pelvic floor remains weak and aching whether the uterus be turned forwards or backwards. The only difference after operation is in the position of the uterus; the symptoms remain the same. This applies also to vaginal fixation. Ventral fixation lifts up the uterus, and to a small extent pulls up the pelvic floor. If there is no prolapse of the vagina ventral fixation will cure descent of the uterus.

But these cases in which, with nothing more than slight descent, relief of symptoms is anxiously demanded, are very often neurasthenic. Some of them can be cured by rest, without either pessary or operation. The enforced rest after ventral fixation is an excellent opportunity for treating the neurasthenia. If this opportunity is neglected, and the patient is allowed to continue living in circumstances unfavourable to her nervous health, the operation will be therapeutically a failure whatever its effect on the position of the uterus.

As there are cases in which we have a choice of operations, though these cases are few, we must consider their advantages and disadvantages. *Alexander's operation* was introduced at a time when the methods of procuring asepsis by antiseptics were less perfect than they are now; when the fact that the peritoneal cavity was opened in an operation meant additional danger; and when it was in consequence supposed to be an advantage of Alexander's operation that the position of the uterus was corrected without opening the peritoneal cavity. But at the present time, whether the peritoneal cavity is opened or not is hardly a thing to be taken into account. I think Alexander's operation a more dangerous operation than ventral fixation. I have published a case, and seen another, which proved fatal from suppuration within the pelvis along the track of the ligaments, extending to the peritoneum. It may be said

that such a result only indicates imperfect antisepsis, and is a reflection on the operator, and not on the operation. But I think not, for in these cases, the inguinal wounds, the only parts with which the operator's fingers and instruments had come into contact, had healed by first intention. I attribute the result to detachment of the ligaments from their vascular supply; for the round ligaments, like the ureters, are not very vascular. I have seen a case in which inguinal hernia followed the operation. This I grant is the fault of the operator in not properly sewing up the inguinal canal. In one case in my experience one ligament broke off, and the uterus had to be left supported by one round ligament only. I know not how the operator could have prevented this. I may add that this case was therapeutically a complete success. I have heard of other mishaps such as failure to find the ligaments, and division of the epigastric artery. I have seen statements in American literature implying that the number of unpublished cases in which the termination of the case was not that desired by the operator, is considerable. And unfortunate results of Alexander's operation do not invariably imply surgical incompetence, for among those who have told me of such results in their practice was the late Mr. Lawson Tait. But be the results what they may, I have not for years performed the operation and do not intend to do it again.

Methods of shortening the round ligaments by different modes of intra-peritoneal stitching have been devised. I have had no experience of them, and do not feel tempted to try them. I can perceive no way in which the result of any method of shortening the round ligaments can be superior to that of ventral fixation; and the objections to ventral fixation apply equally, it seems to me, to intra-peritoneal shortening of the round ligaments.

The therapeutic results of *vaginal fixation* are much the same as those that can be attained by Alexander's operation. In retroflexion with great tenderness of the body of the uterus but no symptoms of descent, vaginal fixation is successful in relieving the patient. But where the symptoms are wholly or partly due to descent, vaginal fixation will not cure them. If the pelvic floor is weak, a change in the position of the uterus will not make it strong. It is claimed as an advantage of this operation that it leaves no scar in the abdominal wall. But a small scar in the abdominal wall, if the muscles and fasciæ are properly sewn together, is no great matter. The cases in which vaginal fixation may be expected to be successful occur especially in unmarried women, and in them vaginal fixation involves destruction of the virginal characters of the vaginal orifice. This

may sometimes be thought a greater detriment than a scar in the abdominal wall. Vaginal fixation is a simple operation, simpler than Alexander's operation, and it is difficult to see why, with proper asepsis, any misfortune should arise from it. My own doubt about this operation is as to the permanence of the result. I have sewn a uterus into a position of anteversion, and years afterwards have found the uterus not indeed retroverted again, but less anteverted than it was immediately after the operation. The vesico-uterine cellular tissue is very loose; and as vaginal fixation practically consists in tying the uterus to this tissue, I think we cannot be very much surprised if in time this tissue should stretch.

In prolapse we have a different state of things to deal with. We must recognise that to the patient the only thing that matters is that she has a local condition that causes uncomfortable sensations. She knows not where her womb is, and is quite indifferent to its whereabouts. The uncomfortable sensations are due to weakness or injury of the pelvic floor. Now in great prolapse the changes in the pelvic floor are too extensive to be appreciably altered by fixing the uterus to the abdominal wall. If for prolapse ventral fixation alone is done, the invariable result, in my experience, is that within a few months the patient either comes back, or goes to another surgeon, complaining that the womb comes down as badly as ever. When she is examined, it is found that there is no prolapse of the uterus, but there is prolapse of the vagina. Cystocele and rectocele remain practically unaffected by ventral fixation of the uterus.

To be of use in prolapse ventral fixation must be combined with an operation to narrow the lower part of the vagina, so that prolapse of the vagina may be prevented. If combined with such an operation, ventral fixation is efficient in the cure of prolapse. Elytrorrhaphy alone will not cure prolapse, because then the uterus comes down and bulges open the contracted vaginal orifice; but if this is prevented by tying up the uterus to the abdominal wall, the result of elytrorrhaphy will be lasting.

The subject of our discussion is ventral fixation and not the treatment of prolapse; and therefore I refrain from discussing other methods of treating prolapse. But I may be allowed to say that I think that in elderly widows the best treatment of prolapse is the removal of the uterus *and* vagina, and that in younger women I think the most hopeful treatment will be found in Hey Groves's operation for the repair of the *levator ani* muscle. But there has not yet been time for these operations to be sufficiently tested.

It is necessary now to consider the objections to ventral fixation. These are: —

First, the immediate danger, the risk of septic infection, and the risk of putting tension on the peritoneum. These ought to be prevented.

Second, the risk of hernia. Hofmeier mentions a case.[1] This, I think, can be prevented by careful suture of muscles and fasciæ.

Third, the risk of pulmonary embolism. I know not why this accident should follow ventral fixation, but Weindler[2] has mentioned a case in which death took place from this cause on the thirteenth day after the operation.

Fourth, I find four cases recorded[2] of death due to obstruction of bowel by bands passing from the uterus to the abdominal wall, long after the operation. I find other cases in which, in pulling tight the sutures, the bowel was nipped between the uterus and abdominal wall, and the abdomen had to be reopened to relieve obstruction thus caused.[3]

The last-mentioned accident surely may be prevented by proper care in the performance of the operation. As to the obstruction by bands, we know that adhesions of peritoneum to peritoneum are often absorbed, and that they stretch. If therefore in ventral fixation the peritoneal surface of the uterus is stitched to the peritoneum of the abdominal wall, it is not surprising that the adhesion should stretch and possibly in time be absorbed. If the adhesions should elongate into a band, then there will be danger of obstruction some day arising. But when peritoneum is stitched to muscle, as in colotomy, the adhesion neither stretches nor is absorbed. I think, therefore, that in performing ventral fixation the parietal peritoneum should be separated from the muscle, and the uterus stitched to muscle.

Fifth, Weindler states that he has once seen parametritis follow ventral fixation.

Sixth, suppuration has taken place along the suture tracks. These sequels are not of ultimate importance, but they delay convalescence.

Seventh, in one case I found the scar remain painful and tender for many weeks after the operation although there had been no suppuration or other hindrance to recovery. To lessen dragging on the adhesion I inserted a Hodge's pessary which the patient wore for three months. At the end of that time all pain and tenderness had gone, the pessary was removed, and the patient remained perfectly well. I have seen the same thing mentioned by others.

Eighth, the possible dangers incident to subsequent pregnancy and labour. This requires careful consideration. Fortunately we

have data for forming a judgment in an excellent paper laboriously compiled by Dr. Russell Andrews. In that paper he has collected and analysed 395 cases of pregnancy and labour following ventral fixation of the uterus, a larger number than has been collected by any previous investigator. A few more have been published since in a paper by Seegert.[4]

The first thing to be remarked is that, in the great majority even of these cases, labour was normal. I say even of these, because Andrews remarks that many of them were published because they were instances of successful obstetric operations and therefore interesting cases.

Abortion occurred in 9 per cent. Now the average frequency of abortion as compared with labour at term is as one to five, or 20 per cent. If these figures represent the usual result we must conclude that ventral fixation prevents abortion rather than favours it. It is clear that the operation does not cause abortion. In 9 cases labour came on prematurely, a number so small that we can say that ventral fixation does not cause premature labour. In 12 cases there was some trouble—pain or functional disturbance—during pregnancy. The number is small, and when we remember that a considerable proportion of the patients in whom displacements give such trouble that operations are demanded are neurasthenic, it is not surprising to find some of them still complaining of pain. The fact that only twelve of them did so shows that pain in pregnancy is not an effect of ventral fixation.

Andrews finds that according to published reports of cases high position of the cervix is the most common cause of difficulty in labour after ventral fixation. This difficulty was met with in 22 cases out of 395, a small number after all, only 5·5 per cent. But when we look into these cases, some of them are very hard to understand. In one of them the difficulty clearly was only in the mind of the accoucheur, for while he was getting ready to perform Cæsarean section the patient was delivered naturally. There are three in which the *os uteri* is said to have been opposite the first or second lumbar vertebra; that is near the middle of the kidneys and the diaphragm. Without the records of these cases I think one would have said that it was impossible so to fix the uterus that the cervix should be as high as this. In another case the cervix is said to have been so high that Champetier's bag could not be inserted, but the *os uteri* was manually dilated. It is not clear to me why it was necessary to dilate the cervix at all, and I cannot understand a condition in which the operator could get his hand in, but not Champetier's bag.

When I read these records I cannot help being reminded of cases in which the deviation from the normal position of the body and the neck of the womb is much greater than that produced by ventral fixation, viz., cases of retroflexion of the gravid uterus persisting to full term. Many of these cases have ended fatally in consequence of the doctor's endeavours to effect in some artificial way the delivery which he imagined could not take place naturally, while in those that have been let alone natural delivery has always taken place. When I read these cases in which dilatation of the cervix, turning, or Cæsarean section was done because the cervix was high up and it was assumed that therefore it would not dilate, I cannot help coming to the opinion that in some of them the only cause for interference was that the accoucheur was in a hurry. I cannot understand why tying up the fundus should prevent dilatation of the cervix. It may prevent or make difficult the engagement of the head in the brim, but the dilatation of the cervix depends not on this.

The cases collected by Andrews include ten transverse presentations. According to the average frequency there should have been two. If the cervix is so much displaced as to hinder the engagement of the head in the brim, a transverse presentation is a probable result, and an increased frequency of transverse presentations is thus explicable.

The most serious point in Andrews's collection of cases is that three ruptures of the uterus occurred. In one of these, no fewer than 14 stitches had been put in, so the fixing must have been extensive. In another, intra-abdominal shortening of the round ligaments had also been done. These three ruptures of the uterus may be only a fortuitous sequel, but it is also possible that a too extensive fixation, by preventing regular expansion of the uterus, may make it more liable to give way at a part on which undue tension is thrown.

Andrews's conclusion is that broad and dense adhesions are those that give trouble, and that there is less likelihood of trouble if the anterior wall is the part fixed. I think we should rather say the anterior part of the fundus. These conclusions seem to me in harmony with the evidence.

In brief, my conclusions are these:—That ventral fixation is the best mode of relieving symptoms caused by retroversion or retroflexion of the uterus, when the result of mechanical support is not satisfactory. That, combined with elytrorrhaphy but not without it, ventral fixation is an efficient treatment of prolapse. That if the operation is properly performed subsequent difficulty in labour need not be feared.

By "properly performed" I mean that the anterior half of the *fundus uteri* is stitched to the muscle about halfway between the *symphysis pubis* and the umbilicus. I see no advantage in trying to pull the uterus up to the umbilicus, or tying it down immediately above the pubes, or sewing its whole anterior surface to the abdominal wall. Most persons who disapprove of the operation appear to me to be influenced by the observation of cases in which the operation has been done for the relief of neurasthenic symptoms, and has therefore been a failure.

1. *Zeits. für Geburts. und Gynäkol.* Bd. lv.
2. *Monats. für Geburts. und Gynäkol.* Bd. xxi., pp. 754 and 777.
3. Seegert. *Zeits. für Geburts. und Gynäkol.* Bd. lv.
4. *Zeits. für Geburts. und Gynäkol.* Bd. lv.

Withdrawal of the Liquor Amnii: a Cause of Fœtal Death and Placental Changes; an Experimental Investigation in the Rabbit.*

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The experiments upon which the following paper is based were undertaken in the first instance in the hope that they might add something to our knowledge regarding the origin of the *liquor amnii*. Although they have failed to throw much light on this difficult problem they have given interesting results with regard to fœtal death and the changes which the dead fœtus and its placenta undergo while retained *in utero*. To a consideration of these the main part of what follows is devoted.

The animals selected for experiment were rabbits. They were chosen because of the facility with which they can be obtained and bred, and also because the structure of the placenta has been very fully worked out by Minot,[1] Duval,[2] and Chipman,[3] the last named especially giving a most minute and detailed account of the whole gestation period.

Rabbit's uterus. The rabbit's uterus consists of two cornua, entirely distinct and separate from each other except at their vaginal extremities where the apposed walls are fused for a short distance. Each opens separately into the common vagina. At the other extremity they are continuous with the Fallopian tubes which are convoluted and much narrower than the uterus proper. The muscular coat of the cornua is in two layers, an outer longitudinal and an inner circular. These layers are of equal thickness and between them is some loose connective tissue.

The mucous lining is raised into a series of folds two of which, situated one on either side of the mesometrium, are especially large and are known as the "placental" folds, as it is by their hypertrophy that the maternal part of the placenta is formed when an impregnated

* Read before the Edinburgh Obstetrical Society, being part of a Thesis presented to the University of Edinburgh for the degree of M.D., and awarded a gold medal. The expenses of the investigation were partly defrayed by a Carnegie grant.

ovum comes in contact with them. Ovulation is said as a rule to occur a few hours after insemination, and from three to nine ova are discharged at one time. These entering the oviduct are fertilised and continue to travel down the duct into the uterus which they reach about the third day. The ova are spaced out at more or less regular intervals in each cornu and as the intervening parts remain of almost the same diameter as before impregnation the horn becomes divided up into a series of sacs, each containing an ovum. As a rule the sacs in the two cornua are unequal in number and all the sacs may not be of the same size, this being due to the fact that some of the ova are later in being fertilised than the others. In carrying out the experiments care was always taken to select for observation and control sacs which were of equal size and so presumably of the same age. As pregnancy advances the sacs increase in size at the expense of the intervening portions of the horn. Parturition occurs 30 days after insemination.

Method of experiment. The method of carrying out the experiments was as follows. The animal having arrived at the desired period of gestation, which varied in different cases, and which was calculated from the day of insemination, it was anæsthetised with ether and fixed down on its back to a holder. The abdomen was shaved and thoroughly cleansed with a solution of lysol. A piece of fine gauze wrung out of warm lysol solution was then spread over the animal so as to cover the abdomen and limbs. All instruments used were thoroughly sterilised. A linear incision $1\frac{1}{2}$ in. in length was made in the middle line above the pubes, and the abdomen opened. The uterine cornua, with their gestation sacs, at once appeared in the wound and were expressed from the abdomen with as little direct handling as possible. It was necessary to have all the sacs completely in view in this way in order to select for experiment and control only those which were of the same size, and also in order to be certain of the exact position in the horn of the sac punctured. A warm, moist piece of gauze was placed over the extruded sacs, and one, or in some cases two or more, sacs were selected for aspiration. The syringe used was an ordinary glass serum syringe with a fine sharp needle. The needle was made to enter near the roof of the sac and thus well away from the placenta, and great care was always taken to avoid injuring the fœtus either by the needle or by the fingers which steadied the sac. The fluid was then withdrawn, the amount varying according to the stage of gestation. A slight leakage occurred in some cases after the withdrawal of the needle.

In the earlier experiments this was all that was done, but in the

later ones, owing to the necessity of obtaining a standard by which to judge of the placental changes induced, one of the normal sacs was in every case excised complete. This was not done in the earlier experiments for fear of causing abortion, but when this did not follow the simple operation with the necessary handling of the uterus during it, excision of a control sac was tried. The results were entirely satisfactory. The only animal which aborted during the investigation was one which was almost at full time at the date of operation. It is a remarkable fact that the rabbit's uterus tolerates such interference, a point which will be discussed later. The method of excising the sac was a very simple one. A double ligature was passed through the mesometrium opposite the centre of the sac, and this was tied on each side between the sac to be removed and that on each side. The sac was then cut away above the ligature. After returning the uterus into the abdomen, the abdominal wall was closed with through and through horse-hair sutures and a collodion dressing was applied.

The animals, as a rule, made a perfect recovery, only one showing any sign of sepsis, and it was at once destroyed. After the lapse of a certain number of days, varying from 3 to 14 in the different experiments, the animal was killed by the administration of chloroform. The abdomen was immediately opened and the entire uterus excised, the vagina and mesometrium being previously ligatured to prevent the escape of blood from the placentæ. The uterus was hardened in formalin for 24 to 48 hours, and then the different sacs were cut across transversely, and their naked-eye characters noted. They were then prepared for embedding in paraffin and cut in serial sections.

Eight complete experiments in all were done, the period of pregnancy varying from the 10th to the 21st day, and the interval which elapsed between the operation and the death of the animal from 3 up to 14 days. The stage of gestation at which the operation was performed did not at all affect the nature of the changes induced in the fœtus and placenta, so that the experiments form a progressive series in so far as these changes are concerned. Two of the experiments were performed at the 12th and one at the 10th day of gestation, and in these the fluid aspirated was the yolk sac fluid. The amnion in the rabbit is not completely closed in until the 10th day, and does not become distended with fluid till after the 12th, and up to this time the great part of the ovum consists of the yolk sac and its fluid contents. In the other five experiments, one performed at the 14th, one at the 15th, two at the 16th, and one at the 21st day of gestation, the fluid withdrawn was the *liquor amnii* which at these

dates occupies almost the entire space between the placenta and roof of the sac, the non-vascular part of the yolk sac wall becoming absorbed and the yolk sac ceasing to exist. The results obtained by the withdrawal of the yolk sac fluid in no way differed from those got by the aspiration of the *liquor amnii*.

Such in brief was the method of experiment. Without entering into a detailed account of each case, the general results obtained and the conclusions to be drawn therefrom will now be indicated.

Results. When the animals were killed the sacs which had been aspirated were always found to be much smaller than the normal sacs. This was due to the fact that there had been no re-secretion of the *liquor amnii* and that the fœtus had died and so ceased to grow. This contrast between the normal and punctured sacs is well seen in figures 1 and 2.

The sequence of events after the withdrawal of the fluid, were it yolk sac fluid or *liquor amnii*, was (1), death of the fœtus and subsequent degeneration; (2), placental changes; (3), arrested secretion of the *liquor amnii*.

These three results will be dealt with separately.

The Fœtus.

All the experiments resulted in the death of the fœtus in the punctured sac; further, death occurred almost immediately after the aspiration of the fluid, for the development of the dead fœtus as studied macroscopically and microscopically after the death of the mother, corresponded to that of the one in the normal sac excised at operation. This excision of the normal sac gave an exact method of verifying the time at which fœtal death occurred.

Cause of fœtal death. Since death occurred in all the cases it follows that the cause cannot be the mere absence of the *liquor amnii*, for, as mentioned above, in three cases this was not interfered with. Great care was in all cases exercised to avoid direct injury to the fœtus by the needle, and I am convinced that in no instance was any such injury inflicted, for, had the fœtus been punctured, the fact would have been easily recognised at the time or at the subsequent post-mortem examination. In no case was this so.

In the cases in which the amniotic fluid was withdrawn there is no direct evidence as to the cause of fœtal death. As will be indicated later, it is quite clear, from a study of the placenta, that the death of the fœtus was not due to placental degeneration. It is rather to be looked for in the arrest of the circulation consequent upon the general alteration of pressure within the sac following on

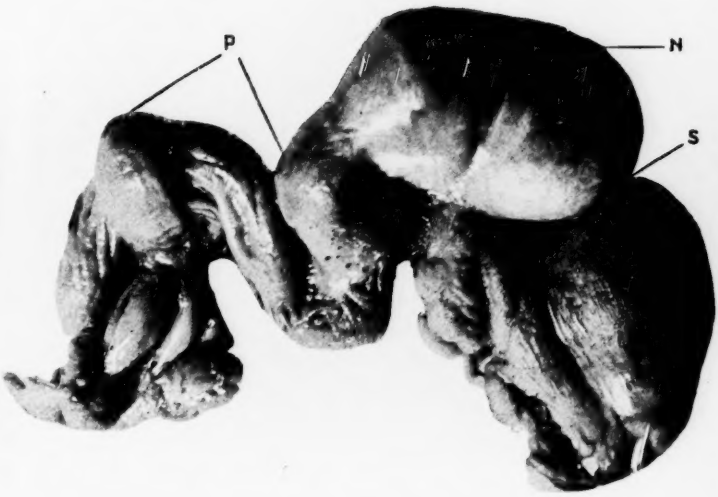

Fig. 1.

Fig. 2.

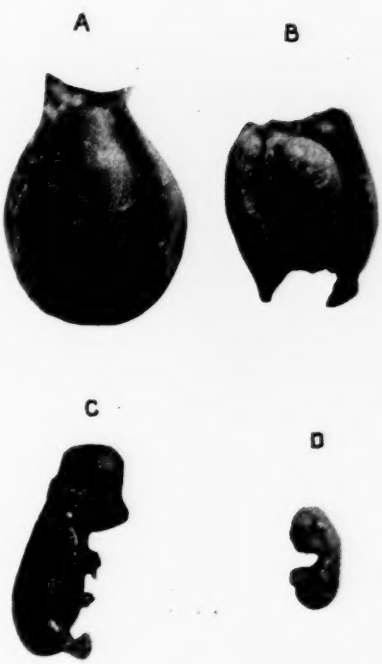

Fig. 3.

aspiration of the fluid. In one of the cases in which a sac was excised ten minutes after aspiration, it was noted that the uterine wall had contracted so as to follow up the collapsed amniotic sac, and that this contraction had resulted in the compression of the placenta from side to side, so that the ectodermic columns were closely compressed, and that in consequence many of the fœtal vessels in the mesoderm had their walls approximated and were partly emptied of blood. This compression of the placenta was a constant feature in all the punctured sacs; the compression and partial obliteration of fœtal vessels in the mesoderm (figs. 2*c*, 7 and 8) were also constant. In none of the cases was it evident that a complete arrest of the fœtal circulation in the placenta had been thus effected, but in all there was marked evidence that the yolk sac circulation which in the rabbit persists up to the end of gestation, had been interfered with. Robinson[4] has shown that in rats and mice the yolk sac is an important nutritive organ which fulfils its functions up to the end of gestation. Although the arrangement of the yolk sac in the rabbit almost certainly points to its taking a smaller share in the nutrition of the embryo than does that of the rat and mouse, still the circulation in it must be of some nutritive or respiratory importance, and any interference with it, such as resulted from these experiments, must affect the vitality of the fœtus. The arrest of the vitelline circulation consequent upon collapse of the yolk sac wall was, then, probably one of the causes of fœtal death, the other being the retarded circulation in the fœtal part of the placenta. This explains why death of the fœtus occurred both after withdrawal of the yolk sac fluid and of the *liquor amnii*.

The mere absence of *liquor amnii* may have played a part in the latter cases but on this point I have no direct evidence to adduce either for or against. That the *liquor amnii* is not in all cases necessary for the life of the fœtus is shown by cases of extra-membranous development of the human embryo, several of which have been recorded. In these cases the amniotic sac is represented by a small pouch situated on the surface of the placenta close to the insertion of the cord, while the fœtus lies outside it but may still be alive at or shortly before the time of birth.

The changes which the dead fœtus undergoes were very characteristic. The normal pink translucent appearance of the living fœtus gives place to the dull grey aspect of the degenerated one, while the rounded contour is lost, the dead fœtus becoming flattened out between the face of the placenta and the upper wall of the sac. In its flattened appearance it closely resembles the *fœtus papyraceus* of occasional occurrence in the human subject (figs. 2 and 3). In

this connection it is interesting to note that no case of *fœtus compressus* is known in the human subject apart from twin pregnancy where the pressure of one fœtus flattens the other. The flattening of the fœtus in these experiments has, on the other hand, been due to the pressure of the uterine wall itself against the face of the placenta.

The exact significance of the pathological appearances of the *fœtus compressus* is a disputed one. Ahlfeld and Schatz[5] hold that the flattening is essentially a teratological condition. The latter, from a study of 7 cases, comes to the conclusion that as a result of the imperfect blood supply of one of the fœtuses in some cases of uniovular twins the nutrition of that twin suffers and there is oligohydramnios. This, together with the thinness of the fœtus allows of the latter being readily compressed.

Ballantyne,[6] on the other hand, regards the flattening as a secondary occurrence following the death of the fœtus from such causes as insufficient circulation in the common placenta or from placental hæmorrhage, and subsequent absorption of the *liquor amnii*. The results of these experiments entirely bear out this latter view, viz., that the first thing to occur is the death of the fœtus, and that after softening and degeneration have begun it becomes flattened out. That is what one would naturally expect, for the natural resilience and elasticity of the living tissues are sufficient to prevent any marked deformity which on the other hand is readily produced when these are lost, as the result of death and degenerative changes.

In none of the cases was there any swelling of the tissues or accumulation of sanguinolent fluid in the abdomen such as is met with when macerated fœtuses are retained in the human uterus, bathed in *liquor amnii*. Hourlier,[7] who has examined a number of such cases, explains the accumulation of fluid as resulting from breaking-down of blood clot which has formed in the pleural and peritoneal cavities as a result of the death of the fœtus from asphyxia. There have been no such hæmorrhages in any of my cases.

By microscopic examination a progressive series of degenerative changes can be traced in the various tissues and organs as the time of retention of the dead fœtuses *in utero* lengthens. The changes begin early in all the tissues, but the rate at which they advance vary considerably in the different organs and histological elements.

By the third day the surface epithelium is entirely lost. The protoplasm of the epithelial cells swells up and becomes degenerated at the margins, while the nuclei become granular. In this way the attachment to subjacent structures is loosened and large areas become detached and thrown off. The connective tissue cells are early

affected. They undergo a process of granulation and breaking down, while the nuclei become first swollen and then granular and finally disappear. The liver and heart are the organs which undergo most rapid degeneration and disintegration. The kidney and pancreas, on the other hand, break down more slowly. The nature of the change is the same in all cases, namely, a swelling of the cell protoplasm and a granular degeneration of the nucleus. The connective tissue cells resist longer than the special histological elements of the various organs. The cells of the pancreatic glands resist the process of disintegration longer than any others.

Pathology of the Retained Placenta.

The rabbit's placenta is easily differentiated into its two parts, fœtal and maternal. The latter is formed by the subcutaneous tissue of the two placental folds of the mucosa and is therefore a bilobed organ. The connective tissue cells proliferate, and those round the blood vessels become transformed into large decidual cells, which are at first uninucleated. The capillaries enlarge into blood sinuses with a swollen endothelial lining. Towards the later stages there is a leakage from the blood sinuses so that fibrin is deposited round their walls and extends out among the decidual cells. These cells at the same time become polynuclear and towards the end of gestation undergo a process of degeneration. In a zone of the placenta next the uterine attachment the decidual cells remain uninucleated throughout, and the sinuses are always small with no fibrin deposit round them. At about the mid term of pregnancy this zone is clearly differentiated from the rest of the maternal placenta. From this time onwards the uninucleated decidual cells begin to shrink and the tissue becomes more and more attenuated. This zone is known as the "zone of separation" as it is through it that the placenta becomes detached at parturition.

The fœtal part of the placenta consists in the early stages of solid columns of ectoderm which extend along the fibrin-lined maternal sinuses replacing the endothelium. Into these solid columns of ectoderm the mesoderm extends, carrying with it the fœtal vessels and dividing the columns up into finer and finer tubules. This subdivision of the ectoderm goes on till about the 26th day, by which time the placenta is fully elaborated and all that separates the fœtal from the maternal blood are a thin layer of ectoderm (which has now lost its cellular character and become plasmodial), and the fœtal capillary wall.

The changes which the placenta undergoes while retained *in utero* after the death of the fœtus will now be detailed.

The only changes observed in a sac excised ten minutes after aspiration of the fluid were compression of the two lobes of the placenta from side to side, and the pressing together of the columns of ectoderm in the fœtal placenta, so that the mesoderm with its contained vessels was compressed. This resulted from the contraction of the muscular wall of the sac.

After an interval of three days the walls of the punctured sac are further thickened and the placenta is more compressed, so that the fœtal part is distinctly less vascular in appearance than normal. At the same time there is a slight deposit of coagulated lymph in the mesoderm at the surface, and in the substance of the fœtal placenta. In one or two isolated areas the ectoderm shows signs of commencing degeneration as evidenced by the deficient nuclear staining, but it still retains its power of penetrating the maternal tissues. The maternal placenta differs from normal only in the greater amount of fibrinous deposit among the decidual cells, and the more distinct differentiation of the zone of separation, due mainly to this, but partly to the greater attenuation of the tissue itself. The placenta as a whole, therefore, three days after the death of the fœtus, shows only slight departures from normal. It has gone on developing along the normal lines, and in the case of the maternal part shows an accelerated development by the more extensive fibrinous deposit and more marked zone of separation, so that it has the appearances of a 21st or 22nd day placenta instead of a 19th day one, the time at which the animal was killed.

After a five days' interval, changes of the same kind are observed in the maternal placenta. There is more fibrinous deposit, and there is a more marked zone of separation, as compared with the normal, than is present after a three days' interval, while many of the vessels are fibrosed. As the area of fibrin deposit has increased, the decidual cells have changed from uninucleated into multinucleated, and some of the latter have degenerated, just as happens in the normal placenta. The fœtal placenta, however, now shows signs of degeneration. The mesoderm is extensively invaded by fibrin threads, which in places form *laminæ*. The ectoderm in the centre is markedly degenerated, nuclear staining being lost and the protoplasmic staining irregular. Although at the maternal surface the degeneration is less marked, the power of penetrating the maternal tissues is lost.

As the interval that elapses between the death of the fœtus and that of the mother lengthens from 5 to 7, 9, 10, 12 and 14 days, as in

the remaining experiments, a progressive series of changes can be traced along these lines. The fibrinous deposit in the maternal placenta becomes more extensive, and the fibrin *laminæ* become denser, so that the decidual cells degenerate and disappear. The fibrin *laminæ* round the vessels become thickened so that many of the latter are blocked, while the tissue forming the zone of separation becomes more attenuated as contrasted with the normal. The fibrinous deposit in the fœtal mesoderm becomes more marked, and after an interval of nine days begins to invade the ectoderm, breaking it up and compressing it. The ectoderm undergoes a progressive degeneration, and ultimately almost completely disappears among the mass of fibrin which after an interval of 14 days comes to make up the great part of the fœtal placenta.

It is thus evident that the changes in the placenta following on the death of the fœtus are of an entirely different nature in the two component parts—fœtal and maternal. The latter goes on developing along the normal lines, and all the departures from normal are merely of degree and are an expression of accelerated development. The fœtal placenta, on the other hand, undergoes processes which never occur in the normal sac, such as the deposit in the mesoderm of fibrin and coagulated lymph, and the degeneration of the ectoderm.

The fibrinous deposit which occurs in the maternal placenta takes place in the same situations as in the normal sac, and there is no evidence to show that its mode of production differs in any way from normal, *i.e.*, by a slow leakage through the fibrin lined walls of the maternal sinuses. The only difference is that it occurs more quickly and more extensively, and that this results in the more rapid transference of the uninucleated into polynucleated decidual cells, and the more rapid degeneration of the latter, so that, a placenta which is at, say, the 20th day presents appearances like those met with at the 22nd or 23rd day. At the same time the placenta increases in bulk in those cases where the operation has been done during the growing period.

This behaviour of the maternal placenta throws considerable light on the rarity with which abortion was induced during the course of the investigation. It is a remarkable fact that such interference as the uterus was subjected to in every case—the manipulation, the aspiration of fluid from the sacs, and the complete excision of part of the cornu—resulted in abortion in only one instance, and in that case the animal was at the 28th day. That abortion is prevented by the presence of other sacs on the proximal side of the punctured one is negatived by the fact that when there is only one sac in the horn, and

that is punctured as in one of the experiments, it did not occur (fig. 1).

From the structure and mode of development of the maternal placenta, we should not expect it to be easily cast off in the early stages before the zone of separation has formed, as it is practically one with the rest of the cornu with a broad base of attachment. The subsequent changes which it undergoes are for the purpose, firstly, of allowing a sufficient blood supply into which the fœtal structures may dip and providing a tissue, fibrin, through which they can readily penetrate, and secondly, of providing a zone through which the whole may be cast off with a minimum loss of blood and destruction of tissue.

The latter phase of development has been accelerated in the placenta of all the punctured sacs, for in all of them there has been noted a development of the zone of separation, and an attenuation of its cellular elements in advance of the normal, at the period examined. This I take to indicate a tendency to the earlier casting off of the dead ovum, and in one of the experiments this actually occurred, the whole ovum and maternal placenta lying free in the uterine cornu, the latter having been detached through the zone of separation at the 28th day, while the normal *placentæ* were quite firmly attached and presumably would have remained so for two days longer when full time would have been reached.

It is well known that it is often extremely difficult to induce abortion in the human subject provided the ovum be healthy, and that in many cases nothing short of manual separation will serve. This is due to the close incorporation of fœtal and maternal structures, and to the fact that the "zone of separation," which in the human placenta may be regarded as the spongy layer of the decidua, has not sufficiently developed. In the rabbit's placenta we see the development of this zone much more clearly and definitely than in the human subject, and its accelerated development in cases where the fœtus is dead is very instructive as showing that while there is a tendency to abortion this cannot take place until a certain definite series of changes has occurred. What it is that determines the formation of the zone of separation in the placenta is not known, but these experiments show that it cannot be dependent in any way upon the vitality of the fœtus belonging to it. Indeed, one of the most remarkable results of these experiments has been the demonstration of how little the development of the maternal placenta is so dependent.

Fig. 4.

Fig. 5.

I would here then emphasize this fact that the dead ovum and placenta are not cast off till certain definite developmental changes have been gone through, these changes being in every respect analogous to those which determine the separation of the normal placenta.

Fig 2 shows the zone of separation as seen by naked eye, and brings out the contrast between the normal and the punctured sacs, while figs. 4 and 5 show the microscopic appearances.

What the changes in the placenta would be, when the initial cause of its degeneration resided not in the fœtal but in the maternal structures, I have not determined. It is conceivable that a large hæmorrhage, occurring for instance close to the line of attachment to the uterine wall, would so tear up the tissues as completely to detach the placenta before the zone of separation had developed. Abortion in the human subject is sometimes due to such a cause, the ovum being at once expelled in a perfectly fresh condition, and with a fœtus which has the appearances proper to the period of pregnancy at which the abortion occurs.

On the other hand it is common to find on examining an abortion sac that the placenta and decidua present appearances which differ little from normal, while the fœtus is in an advanced state of softening and disintegration, and has evidently been dead for some time. It has accordingly been inferred that such cases of abortion are due primarily to the death of the fœtus, and that the placenta has to a certain extent retained its vitality.

Referring to this subject Ballantyne[6] in his "Antenatal Pathology" says:—"It is possible that there may be a greater independence between the vitality of the fœtus and that of its annexa than has hitherto been supposed, and that when the cause of fœtal death resides in the fœtus itself the life of the placenta may, to a certain extent, be continued. When, on the other hand, the fœtus dies because the placenta is practically dead, the dependence will be more manifest." These experiments, I think, bear out this opinion, for although no perfect analogy can be drawn between the placenta of the rabbit and that of the human subject, yet the broad general lines of their structure and development are essentially the same, and the degree of dependence of the fœtal on the maternal structures, and vice versa, must be identical, so that we are justified in regarding the sequence of events as they occur in the rabbit's placenta, following on the death of the fœtus, to be the same as those which occur in the human placenta under similar circumstances. This point of difference must, however, always be kept in mind in interpreting the

pathology of the human placenta in the light of that of the rabbit, viz., that in the rabbit the placenta of the dead fœtus shares in the augmented blood supply which the presence of the other sacs in the horn determines.

While the maternal part of the placenta thus maintains its vitality, it is otherwise with the fœtal portion, as the changes which it undergoes are mostly an expression of the death of the tissue. This death does not occur for a few days after the death of the fœtus, as after an interval of three days the ectoderm still retains its power of penetrating the maternal placenta. The first pathological change observed is a deposit of coagulated lymph in the mesoderm at the surface. This is the result of a slow leakage from the fœtal vessels. As the interval between the operation and the death of the mother lengthens, this fibrinous deposit in the mesoderm becomes denser and extends throughout the substance of the placenta, while the cellular elements degenerate.

The changes which the ectoderm undergoes are very characteristic. They are of slower occurrence than those in the mesoderm, as, after an interval of three days, as already mentioned, it still retains its vitality where it is in contact with the maternal tissues. It must be from them that it derives its nourishment, as all circulation in the fœtal mesoderm must cease after the death of the fœtus. After a five days' interval degeneration is present as evidenced by the granular cell protoplasm and faint or entirely absent nuclear staining.

The degeneration is most marked in the central areas, and least so at the maternal junction, where many of the cells are in actual contact with maternal blood.

At intervals of 7, 9, and 10 days the degenerative changes progressively increase so that the original structure of the fœtal placenta becomes gradually lost, the division into columns is no longer recognisable, and it assumes a dense, solid structure, in which no cell outlines can be distinguished. After 12 and 14 days the fibrinous deposit everywhere invades the ectoderm so that the latter can only be recognised in patches (figs. 6, 7 and 8).

It would thus appear that the ectoderm has very little power of independent growth in the rabbit's placenta during the middle and later stages of gestation, but that it is dependent for its vitality on the fœtal blood carried by the vessels in the mesoderm. In none of the cases has there been detected any tendency to proliferation of the ectoderm such as occurs in hydatidiform mole and *deciduoma malignum* in the human subject. Eden,[8] in a number of retained human placentæ which he examined, did not once see any prolifera-

Fig. 6.

Fig. 7.

Fig. 8.

tion of the epithelium of the villi, all of which bears out the contention that there must be something in addition to the death of the fœtus which determines the development of these conditions. Haultain,[9] from the study of a case of *deciduoma malignum*, concludes that the epithelium of the villi continues to proliferate and penetrate the maternal tissues only so long as it is in contact with circulating blood, and that when coagulation and extravasation occur it rapidly degenerates. The fibrin deposit in the maternal placenta, in those cases, cannot however be regarded as contributing to the death of the ectoderm, as, in the rabbit's placenta, it is the fibrinous deposit round the maternal sinuses which allows the penetration of the ectoderm, and in the punctured sacs there was evidence that the circulation in the maternal sinuses was going on.

The changes which Eden has described in the retained human placenta correspond very closely to those which I have found in the rabbit. He concludes that after the death of the fœtus the maternal circulation in the intervillous spaces continues actively for some time, but that gradually it becomes slowed in certain areas. The consequence is that the blood coagulates and fibrin is deposited round the villi. This is a process which occurs normally in the human placenta, resulting in the formation of white infarcts. In the placenta of a dead fœtus this process goes very much further, so that the normal spongy consistency is lost, and the placenta becomes extensively consolidated. The fibrinous deposit extends into the compact layer of the decidua, but the spongy layer (which may be regarded as analogous to the zone of separation in the rabbit's placenta) is never so invaded but remains loose and easily separable. Fothergill[10] has described the first stages of connective tissue formation in the fibrin deposit, but Eden holds that there is no such process, and in none of my cases in the rabbit has there been any. The villi ultimately lose their epithelial covering, so that the great majority are only recognisable by their outlines, but, in the spongy part of the placenta, apparently healthy villi can be recognised for a long time.

While, in the case of the human placenta, it can only be an inference that all changes found in it occur after fœtal death, I have been able to prove definitely in my experiments that the changes described do so occur.

With regard to the *liquor amnii*, all that my observations definitely prove is that its secretion ceases with the death of the fœtus, and this in spite of the fact that the maternal part of the placenta shows very little departure from normal for the first few

days after the withdrawal of the fluid. These facts point towards the conclusion that in the rabbit the amniotic fluid is fœtal in origin.

Conclusions.

1. As a result of the withdrawal of the yolk sac fluid and the *liquor amnii* the fœtus at once dies, death being due to the arrest of the vitelline and allantoïc circulations.

2. The dead fœtus and its placenta are retained *in utero*, and the former undergoes degenerative processes and becomes flattened out.

3. The changes which occur in the two parts of the retained placenta—maternal and fœtal—are different in nature.

4. The fœtal part slowly degenerates, the mesoderm becoming invaded by fibrin and the cells of the ectoderm undergoing a granular disintegration.

5. There is no tendency to proliferation of the ectoderm after fœtal death.

6. The changes which the maternal placenta undergoes do not differ in their essential nature from those that occur during its normal development.

7. The placenta becomes detached only when the tissue forming the zone of separation has become sufficiently attenuated, and it does so in the same manner as the normal placenta.

8. The secretion of the *liquor amnii* ceases on the death of the fœtus.

In conclusion I take this opportunity of expressing my best thanks to Dr. A. H. F. Barbour, and Dr. D. Noel Paton for much encouragement and help during the course of the investigation.

Description of Plates.

Fig. I.

Entire uterus removed *post mortem*.

Operation performed when animal was 14 days pregnant. Interval between operation and death of animal 7 days.

Note the contrast between the normal (*n*) and the punctured sacs (*p*). *S* is the site from which the sac was excised at operation.

Fig. II.

Transverse sections of sacs of uterus shown in Fig. 1.

Operation at 14th day. Animal killed on 21st day. *A*, normal sac excised at operation. *B*, normal sac removed *post mortem*. *C*, aspirated sac removed *post-mortem*.

Note that the wall of the punctured sac is thickened and the placenta compressed laterally, while the fœtus (*f*) is flattened out. The amniotic sac is obliterated. Note also the well-marked zone of separation (*s*) in the aspirated sac.

FIG. III.

Showing two sacs with roofs dissected off.

Operation at 16th day. Animal killed on 19th day. *A*, normal sac removed *post mortem* 19th day, showing relation of fœtus in its membranes. *B*, aspirated sac. Note absence of *liquor amnii* and dead fœtus flattened out on surface of placenta. *C*, fœtus from a normal 19th day sac. D, fœtus from a punctured sac. It shows the development of a 16th day fœtus, and must therefore have died immediately after operation.

FIG. IV.

Part of maternal placenta from a normal 16th day sac. (×50.)

Note that no zone of separation is yet differentiated.

FIG. V.

Part of maternal placenta from an aspirated sac. (× 50.)

Operation at 15th day; animal killed at 27th day.

Note the zone of separation (*s*) clearly differentiated from the rest of the placenta which is extensively invaded by fibrin. *U*, uterine wall.

FIG. VI.

Normal fœtal placenta at 16th day. (× 50.)

The ectoderm is divided into columns by the mesoderm carrying the fœtal vessels. There is no fibrous deposit.

FIG. VII.

Fœtal placenta from sac aspirated on the 14th day and removed *post mortem* 5 days later. (× 50.) The ectodermic columns are compressed and the walls degenerated. There is a fibrinous deposit in the mesoderm.

FIG. VIII.

Fœtal placenta from sac aspirated on the 14th day and removed *post-mortem* 7 days later. (× 50.) The division into columns is not recognisable and the ectoderm is degenerated so that cell outlines cannot be recognised. There is an extensive invasion by fibrin.

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A Case of Malignant Teratoma of the Ovary.

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A girl, named E.W., aged 3 years and 11 months, was admitted into St. Thomas's Hospital, under the care of Dr. Hector Mackenzie, on February 27th, 1905.

The patient was one of a family of thirteen, four of whom had died in infancy from "fits;" otherwise there was nothing of interest in the family history. She had been a fairly healthy child up to the last few months, since which it had been noticed that there was a gradually increasing distension of the abdomen. Seven days before admission to the hospital, the child was said to have had a slight injury to the abdomen which had been followed by a much in-increased amount of distension. Two days before admission, she had begun to complain of abdominal pain accompanied by some pyrexia.

On admission she was notably anæmic. The ribs were prominent, but the chest moved fairly well on respiration. There was nothing abnormal in the chest except for a few rhonchi audible over both lungs.

There was enormous distension of the abdomen, more so on the right side than on the left. The respiratory movements were fairly good. On palpation, a hard swelling could be felt occupying the whole of the front of the abdomen. A distinct edge could be felt just below the level of the costal margin, above, and just above the pelvic brim, below. The tumour felt quite hard and some lateral movement could be obtained. A fluid thrill could be felt. The percussion note over the tumour was dull. The transverse measurement at the level of the umbilicus was $22\frac{1}{2}$ inches. The edge of the liver could not be felt; nor could the spleen be felt.

There were some hard glands running along each sterno-mastoid muscle.

The pulse was of good volume and tension, the rate being 120.

The respirations numbered 32 in the minute. The temperature was 99·5°F.

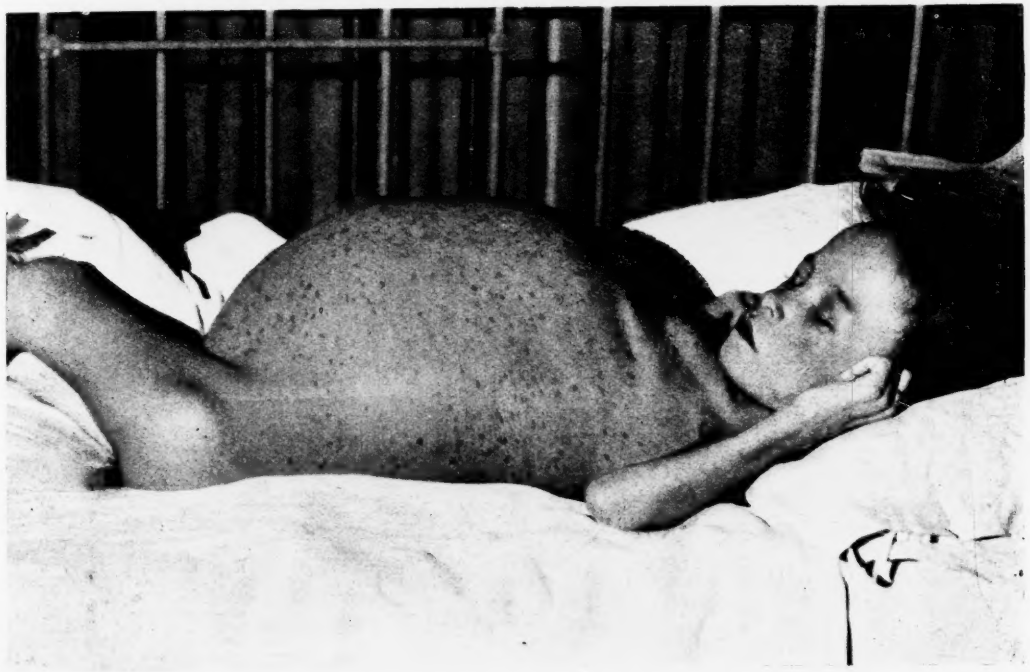

Fig. 1. Photograph of the patient showing considerable abdominal distension and numerous cutaneous hæmorrhages.

The urine was acid in reaction; neither albumen nor sugar was present.

Eight days subsequent to admission, the abdominal measurements were as follows:—

At the level of the umbilicus $22\frac{1}{2}$ inches, midway between the umbilicus and the ensiform cartilage $22\frac{3}{4}$ inches.

One month after admission, the child developed diphtheria, but made an excellent recovery.

Three months after entering the hospital, it was found that the child's abdomen had considerably increased in size. The fluid thrill was much more easily obtained. The abdominal wall was much more tense than previously. Periods of pyrexia occurred during the course of the illness. The child's weight steadily increased. The abdominal pains became more marked. Œdema of the right foot occurred. Vomiting had occurred at times; in fact, everything pointed towards a rapid decline in the child's health.

At this period of the illness, the abdomen was tapped, and a quantity of thick, greenish gelatinous fluid escaped.

After a stay of thirteen weeks in the hospital, numerous nodular growths could be felt all over the abdomen. The superficial veins in this region of the body gradually became dilated.

The child continued to become worse. Scattered hæmorrhages were seen all over the surface of the abdomen. The distension became more marked, and the child finally died a little over five months after admission.

I examined the patient's blood, on the 27th of May, with the following result:—

Leucocytes:—30·900 per c.mm.

Fresh Blood:—Rouleaux formation good, fibrin formation well marked, blood platelets numerous. Poikilocytosis extreme. Large numbers of macrocytes and microcytes present.

The glycogenic reaction was well shown in the large majority of the polymorphonuclear neutrophils and in the blood platelets.

Differential blood count:—

		Per cent.
Polymorphonuclear neutrophils	278	75·6
Mononuclear neutrophils	6	1·2
Polynuclear eosinophils	1	0·2
Transitional leucocytes	1	0·2
Small lymphocytes	18	3·6
Large lymphocytes	74	9·4
Large hyaline cells	49	9·8

1 gigantoblast, 13 megaloblasts, 20 normoblasts, and 2 microblasts were seen while counting 500 leucocytes.

Polychromatophilia and granular degeneration were well marked.

On the 29th of May, I obtained 6½ grains of urea per c.cm. of the fluid removed from the abdomen during aspiration.

Film preparations of this fluid were made and stained by Leishman's method, with the following result:—

		Per cent.
Polymorphonuclear neutrophils	207	41·4
Mononuclear neutrophils	2	0·4
Polynuclear eosinophils	12	2·4
Small lymphocytes	131	26·2
Large lymphocytes	34	6·8
Large hyalins	13	2·6
Endothelial cells	92	18·4
Degenerated cells	9	1·8

5 normoblasts were seen while counting 500 white cells.

The *post mortem* examination was made by Mr. A. E. Mavrogordato, on the 2nd of August, 1905.

The child's body was found to be extremely emaciated, while the enormously protuberant abdomen was out of all proportion to the size of the child.

A huge cystic tumour was found filling the whole of the abdominal cavity; it lay anterior to everything, immediately beneath the abdominal wall to which it was not adherent. It was seen to arise from the left appendages and proved to be a cystic tumour of the left ovary. It was easily removed, as it was nowhere adherent. The remaining pelvic organs were normal.

The glands running along the course of the aorta, were enlarged and congested, but did not suggest invasion by new growths (? hæmolymph glands).

A secondary nodule about 1 inch in diameter, was seen in the right lobe of the liver, and was found on section to be white and homogeneous. The weight of the liver was 19½ ozs.

There was some evidence of congestion of the lungs. Nothing abnormal was noted in any of the other viscera.

Macroscopical Examination.

External appearances. One of the most striking appearances presented by this tumour was the absence of adhesions, more especially considering that it occupied the entire abdomen and weighed not less than 13½ lbs.

The surface was irregular. In places hard, knob-like projections were felt to be dotted over the external surface, while other prominent areas were found to be cystic. In a few places the outermost wall of the tumour suggested old hæmorrhages.

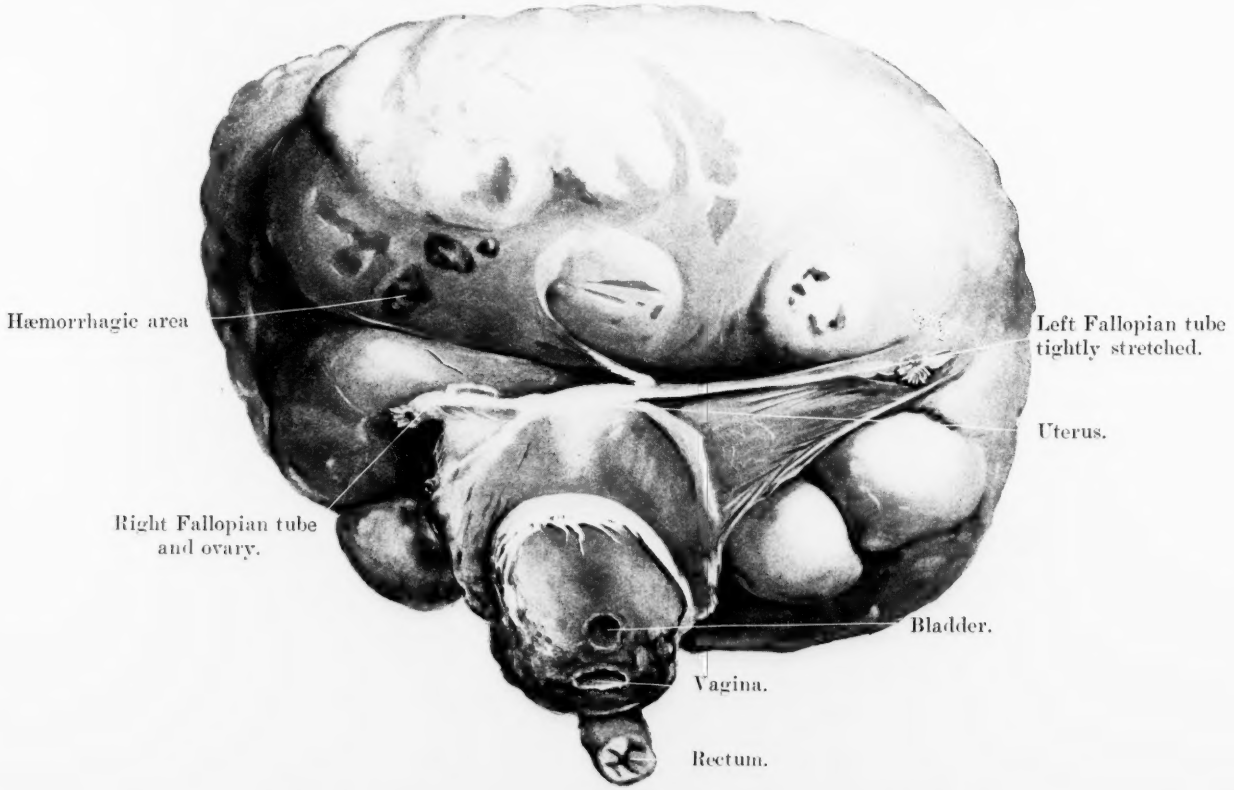

Fig. 2. Enormous ovarian tumour occupying the entire abdominal cavity as seen from the anterior aspect.

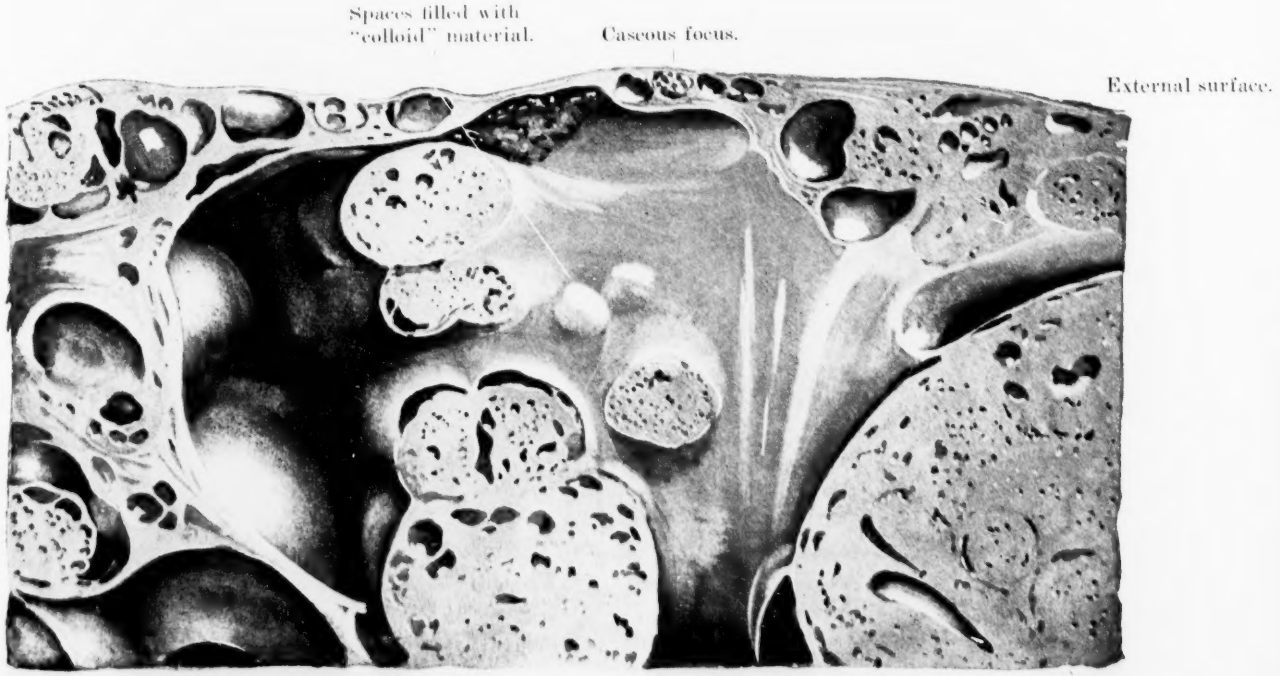

Fig. 3. Vertical section of the tumour to show the peculiar characters of the internal surface.

The left Fallopian tube was tightly stretched round one margin of the tumour which arose, as already stated, from the left ovary. The uterus and bladder lay anterior to it and stood out prominently at the lower and front portion of the tumour. The posterior aspect was flattened; this circumstance was most probably due to mechanical causes.

Internal appearances. A partial section of the entire growth was made after it had been for about three months in a hardening fluid. A large quantity of turbid fluid escaped. There were also numerous spaces, both large and small, filled with turbid jelly-like material which gave a characteristic appearance to the interior of this large mass. The outside wall was seen to be very thin in some places, while in others bands and areas of sponge-like tissue extended from the interior to the exterior. The spaces which the fluid and coagulated proteid filled were lined by a smooth, dull membrane, divided by bands and areas of solid tissue in all directions. Small knobs of solid tissue were seen to be scattered over these smooth areas. In a few places, small loculi were found to contain "caseous" material resembling the substance which is present in dermoid cysts; but no positive evidence was obtained, by naked-eye examination of the growth, of any tissue such as may be seen in teratomata.

The cut surface of the solid portion of the tumour resembled glandular tissue, more especially that of the thyroid. These solid areas were found to be divided up into macroscopical and microscopical spaces by bands of fibrous tissue, and to contain in some instances jelly-like material. Still further, each solid area was capsulated, the capsule being continuous with the fibrous septa of the nodules and with the lining membrane of the large spaces already referred to.

Microscopical Examination. Numerous pieces of the tumour were taken for microscopical examination from various portions of the main growth, and also from the secondary nodule in the liver, and from the retro-peritoneal glands. These were fixed in either salt formalin or spirit and were stained with hæmalum and eosin, with van Gieson's stain, and with ferro-cyanide of potassium and acid alcohol.

The retro-peritoneal glands. These glands were carefully examined but no evidence of new growth was discovered. Microscopically the appearances were those of normal lymphatic glands and not of hæmo-lymph glands, as suggested at the autopsy.

Ovarian tumour. It is a matter of very considerable difficulty to detail with accuracy the histological features of this interesting

tumour. One of the most striking appearances which it presents are well defined spaces lined with cubical, and in some places typical columnar epithelium, in the latter case resembling intestinal mucous membrane. Some of these spaces are surrounded by patches of lymphoid tissue which is a still further approximation to the histological characters of the intestine. In most areas, however, large round cells, with pale nuclei showing a fine network, and spindle-shaped cells are abundant around the epithelium spaces. The delicate connective tissue which surrounds these cells and forms a framework for this cellular tissue resembles the embryonic structures similar to what may be seen in some varieties of very cellular sarcomata.

In a few of the sections, large masses of spindle-shaped cells may be seen, arranged in an irregular manner, resembling the structure of spindle-celled sarcomata.

Throughout the tumour small and large areas of typical hyaline cartilage are seen surrounded by a well-marked fibrous capsule. In some portions of the ovarian tumour, but more especially in the nodule of new growth in the liver, similar areas are apparent. These are not true cartilage. They consist of masses of polyhedral cells with clear but distinct nuclei, which Mr. Shattock kindly suggested to me may be deposits of embryonic cartilage. When the sections are carefully studied, this view appears to be highly probable, and it is undoubtedly an observation of great importance, as no true cartilage is present in the secondary nodule but only this embryonic tissue.

True epithelial pearls and areas of squamous epithelium are scattered irregularly throughout the tumour.

A large amount of coarse, golden-brown coloured pigment, is massed together in one portion of the growth. It was found, however, to be iron free. The nature of this substance is doubtful—it is probably pigment deposited in the tissues and formed from effused blood during the process of aspiration. It might be a deposit of fœtal pigment, but I think the former view is more probable. There is also a small amount of iron-pigment in one portion of the tumour. The area of the new growth already referred to as resembling the naked-eye structure of the "caseous" material found in dermoid cysts consists of a non-cellular structure, granular, staining only with eosin and having no definite histological structure. In one spot, in some of the sections, a circular area of flattened cells is seen enclosing a patch of cellular tissue, with a central area which is coloured with the picric acid of van Gieson's stain and is non-cellular. It resembles an appendage of the skin—probably a hair follicle.

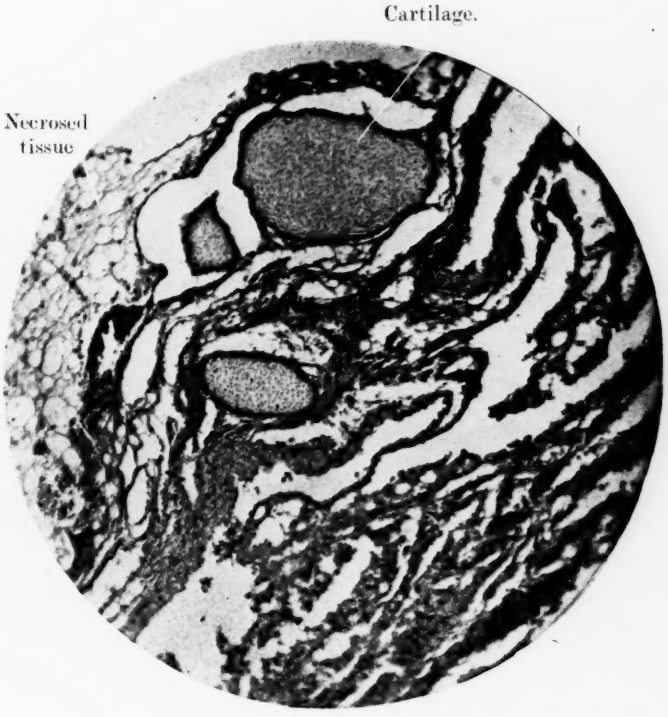

Fig. 4. Section of the ovarian tumour especially to show the area of hyaline cartilage. [No "B" eye-piece: $\frac{2}{3}$ obj.]

Fig. 5. Section of the ovarian tumour including numerous bundles of unstriped muscle fibres. (Van Gieson's method.) [No "B" eye-piece: $\frac{2}{3}$ obj.]

? Embryonic cartilage.

Fig. 6. Section of the secondary deposit in the liver to illustrate the glandular spaces and the tissue resembling embryonic cartilage. [No "B" eye-piece: $\frac{2}{3}$ obj.]

In some places the tissue is degenerated and undergoing a fatty change, but this appearance is far from common. Vascular tissue is to be seen in one portion of the tumour and consists of a fibrous stroma containing darkly staining nuclei enclosing blood spaces of irregular shape and size. The histological appearances are similar to those of a hæm-angeioma. No nerve tissue has been seen. The only glandular structures which have been observed, beyond those already described, consist of a few areas of large cells of columnar type resting on a distinct basement membrane. These cells are of large size, are regular, stain deeply, and somewhat resemble the cells which are found in the lowest layer of the cortex of the adrenal gland. No colloid tissue is present. Unstriped muscle fibres are especially abundant, and form large strands of tissue in some portions of the tumour. The nuclei are clear and sharp, and the fibres are perfectly formed. These muscle bundles are also numerous in the secondary nodule of the liver. Allowing for the fact that unstriped muscle fibres form part of the constituents of the normal ovary, it will not account for the presence of this tissue in the secondary nodule or for the abundance of this tissue in the primary growth, except on the theory upon which the other abnormal embryonic structures can be accounted for, viz., that the growth is a malignant teratoma. The dissemination of the new growth, and the deposit of the secondary nodules in various parts of the body outside the original focus, are not well marked in this case, as, beyond the fact that the primary tumour rapidly increased in size, which in itself is not by any means positive evidence of malignancy, only one small secondary nodule was found, namely, that in the liver.

There was no local extension through the cyst wall invading neighbouring structures, or evidence of lymphatic glandular invasion. On the other hand, the knob-like projections which were present all over the surface of the tumour contained the most typical glandular structure, but yet remained limited to the primary seat. No true bone was seen.

Secondary nodule in the liver. This has already been described while discussing the characters of the primary tumour. A striking feature, however, is the round-celled infiltration in the spaces between the various liver cells; this is present throughout the liver tissue. It is probably that this cellular deposit may be partly accounted for by the severe anæmia from which the child was obviously suffering.

The nature of the fluid contents of the cyst. It has already been stated that there were 6½ grains of urea in one cubic centimetre of the fluid removed from the tumour during life. It is well known that the

fluid obtained from ovarian tumours may contain urea, but only in small quantities. In this case the amount was extremely large; the total quantity, if the entire bulk of the fluid contained an equal amount of urea with the cubic centimetre which I obtained, would have been as much as or even more than an adult man passes in his urine in the 24 hours. The origin of this excessive quantity of urea I cannot hope to explain, but there was certainly no evidence of true renal tissue present in the large ovarian tumour.

Remarks. H. T. Hicks and J. H. Targett published two cases similar to this one in the *Journal of Obstetrics and Gynæcology* for August, 1905. They state that the youngest instance of malignant embryoma of the ovary yet recorded, occurred in their second patient, aged 6 years. The subject of these remarks was much younger, namely $3\ ^{11}/_{12}$ years. The authors just named have collected 11 cases from the literature and added two of their own. It appears from their statements that tissue resembling nerve or brain substance has been recorded in many instances in malignant embryomata of the ovary, but this observation I am unable to confirm from my experience in the present case. Emmanuel and Kramer likewise failed to find any nerve elements in their cases.

It appears from the literature that the dissemination of the growth is chiefly in the peritoneum and retro-peritoneal lymphatic glands. Visceral metastases according to Hicks and Targett are rare. They are only referred to in less than one-third of the cases. The microscopical characters of the secondary growth may show a complicated embryonic structure, or may more closely approach the round-celled sarcoma type of tumour. I have seen a malignant teratoma of the testicle in which the secondary nodules much more closely resembled the structure of a sarcoma than a teratoma, of which the primary growth mainly consisted. In the case which I am now recording the mixed type of neoplasm is as well shown in the secondary nodule as in the original growth.

Age. Hicks and Targett record the age of every case at the time of death; it was as follows:—

6, 13, 14, 15, 17, 20, 20, 21, 22, 27 and 30 years.

The age of the patient in the case which I am recording was, therefore, much less than in the youngest up to the date of their paper.

In conclusion, I should like to offer my best thanks to Dr. Inman for his excellent clinical notes of the case, and to Dr. Hector Mackenzie for permission to use them.

REFERENCE.

1. H. T. Hicks and J. H. Targett. "Two cases of Malignant Embryoma of the Ovary." *Journ. of Obstet. and Gynæcol.*, August, 1905.

Some Points in the Causation of Pelvic Suppuration.*

By G. Rothwell Adam, M.D. (Melb.), M.B., C.M. (Edin.), *Lecturer on Obstetrics and Gynæcology, University of Melbourne; Hon. Surgeon, Women's Hospital.*

In bringing before this section so important a subject as pelvic suppuration, I must crave permission, at the outset, to extend my title so as to include all forms of pelvic inflammation. For I need not remind an audience such as this, that it depends on the dosage and virulence of an infection together with the resistance of the patient, whether an inflammation will pass through all its phases to suppuration. Nevertheless this trinity of problems is presented to each one of us when face to face with a pelvic inflammation, and on a correct solution depends the forecast of the progress of the case. These remarks have been suggested in some measure by the careless use of the term pyosalpinx as signifying a pelvic suppuration, and not infrequently this loose diction is used to cover all forms of tubal inflammation. But, while it may be freely admitted that tubal inflammation is the most frequent cause of pelvic suppuration there are other situations in which pus may be found in the pelvis.

Abscess of the broad ligament is not uncommon, and under certain conditions, to be discussed more fully hereafter, I believe purulent fluid will collect in the pelvis apart from a primary tubal origin. An unusual situation for pus to collect is in the uterine wall. Such an instance occurred in a lady under my care, who, when pregnant, contracted gonorrhœa. The labour was normal and her medical attendant stated that the puerperium presented nothing unusual. Within six or seven weeks after labour she began to complain of pelvic pain and had a rise of temperature, the uterus was found retrodeviated and fixed by an extensive exudate. Under rest and the usual treatment the acute symptoms subsided. The abdomen was opened with the intention of removing the infected adnexa and restoring the uterus to its normal position.

In taking a V-shaped piece out of one uterine cornu in order thoroughly to remove the affected tube, an abscess cavity was opened

* Read before the Obstetric and Gynæcological Section, at the Australasian Medical Congress, Adelaide, S.A., 1905.

and about 3 drachms of pus were evacuated. This cavity did not communicate with the Fallopian tube in any way, nor was there any connection with the uterine cavity. The pus from the uterine cavity was sterile, at all events no cultivations could be obtained from it. An extended experience in operative work for purulent salpingitis has led me to note how frequently the isthmic portion of the tube is free from disease when the ampulla is distended with several drachms of pus. This is the more surprising when we consider that the infection in most cases, if not in all, has travelled by direct extension from the endometrium through the tube to its abdominal ostium. More than this, in many instances the remains of an infective endometritis can be demonstrated, so that we have the two extremities of the tract bearing evidence of disease, while the middle portion, although necessarily traversed by the infection, is apparently free.

It may be that the anatomical relation of the isthmus of the tube to the broad ligament, with its enormous lymphatic and vascular supply, is in a better position for recovery than either the uterus or the ampullary end of the tube. When the above conditions exist a further argument is advanced for the conservative treatment of suppurative salpingitis.

It is now universally recognised that the causes of pelvic suppuration fall under three heads, and the order in which they occur as regards frequency is as follows:—

1. Gonorrhœa.
2. Sepsis (parturition and abortion).
3. Tuberculosis.

Since Neoggerath years ago drew attention to the ravages wrought by the gonococcus when it once reaches the endometrium, increasing experience has amply confirmed his views, so that it may be admitted that pelvic suppuration is chiefly due to this variety of infection. Nevertheless a not inconsiderable number of cases owe their origin to septic infection either after full time parturition or after abortion. A much smaller proportion have tuberculosis as a cause, and owing to peculiarities in pathological and clinical features form a class apart from the two preceding groups. The object of this paper is to draw attention to the part played by sepsis in bringing about a variety of pelvic inflammation, which not infrequently proceeds to the stage of suppuration.

At the outset it is important to recognise that once the genital area is infected by either the gonococcus or septic organisms, the clinical phenomena are to all intents and purposes identical. That is to say, when confronted by a case of pelvic inflammation the only

information that will enable us to differentiate between the two groups of causes will be found in the antecedent history. At first sight this might be thought to be easily obtainable, especially when the infection manifests itself shortly after parturition; but the case just recorded will serve to point out the difficulties in arriving at a correct judgment. How much greater, therefore, must the difficulties of a correct diagnosis be increased, when the patient presents herself months, or it may be years, after confinement?

Again, it is within the experience of most of us who deal with this class of case, that pelvic suppuration by no means invariably or even frequently follows severe puerperal sepsis. In fact, it has become well recognised that it is in those instances in which the infection is of a mild degree, that subsequent pelvic mischief is to be dreaded. I have seen a woman, brought to death's door by puerperal sepsis, and yet within eighteen months delivered of a fine healthy child, and, what is more important for the purpose under discussion, making a normal recovery.

In order to make my meaning more explicit, it will perhaps be better to describe a typical case.

A married woman, the mother of several children, gives the history that all her labours have been normal, and that the convalescences, with the exception of the last, now some months ago, were also satisfactory. During the last puerperium, although not confined to bed for more than the usual time, she had for a few days some elevation of temperature and offensive lochia. She also says she has never been quite well or strong, as she puts it, since this last confinement. Latterly the pelvic pain which hitherto only annoyed her at varying intervals has become persistent. Menstruation, when it recurred (often during lactation), was profuse, unhealthy, and accompanied by pain. Each recurring menstrual period is now marked by a steady decline in her general health. On pelvic examination the indisputable signs of tubal inflammation can be discovered, but without any extensive exudate. Not infrequently the uterus will be retroposed and may deceive the unwary by its apparent mobility. Thus far the case is common enough, but a further stage in not a few instances is reached. Under favourable circumstances the mild, slowly developing infection will wear itself out and the inflammatory process come to an end, leaving the tube occluded at the abdominal end and perhaps adherent, or at all events fixed in close proximity to intestine. Under such circumstances it is conceivable that it only requires something to lower the resistance of the tissues, *e.g.*, influenza, exhausting fevers, etc., in order that the colon

bacillus may pass from the intestine along the line of adhesion and re-infect the damaged tube. That this does take place when the appendix vermiformis becomes attached to the Fallopian tube under such conditions is almost unanimously admitted. Mr. Bland-Sutton recently reported a case where the appendix vermiformis opened into an occluded Fallopian tube and discharged pus into the ampulla. The essential point, in the majority of instances, is the injury done to the tube by a prior infection from the uterus.

In looking over the histories of a number of cases of chronic salpingitis it was noticeable how many dated their ill-health from an antecedent abortion. Nor was this altogether confined to those patients who, either from lack of opportunity or careless ignorance, failed to obtain medical assistance. And in not a few the information was vouchsafed that "the Doctor 'curated.'" In these it might be permissible to doubt if the cure was not, at all events, as bad as the disease, seeing that the tubes became affected all the same.

When it is recollected that the pathological events which accompany abortion—the hæmorrhage, tearing of fœtal envelopes, etc.,—all invite sepsis, it is not to be wondered at that a mild infection ensues with its usual sequelæ. And it is quite conceivable that a failure to maintain an aseptic technique in the treatment of an incomplete abortion will result in an infection of the upper generative tract, notwithstanding an apparently good recovery at the time. It may be asserted as a fairly general rule that the morbidity resulting from an abortion works its greatest mischief at a late date. Instances such as are here mentioned must be familiar to everyone in family practice who cares to follow up obstetric histories by a careful gynæcological inquiry. Of course it is not intended to imply that every abortion is necessarily followed by a salpingitis, but merely to point out how favourable the phenomena of abortion are to the inception of a mild sepsis. One might as well say that in the pre-antiseptic midwifery days every parturient was doomed to sepsis; those of us who experienced those times will remember the frequent outbursts of "puerperal fever" and also its mortality.

While directing your attention to some of the less obvious causes of pelvic inflammation, it may be of some profit to see what lessons can be drawn from them. Let us take first the cases following on a mild sepsis occurring during the puerperium. If it once be recognised that such serious lesions as salpingitis and more or less pelvic peritonitis do sometimes owe their origin to a mild degree of infection arising during the recovery from parturition, it is obvious that more importance will be attached to abnormalities of the puerperium even though they be slight and temporary. If practitioners would under-

take to mould maternal opinion in the direction of submitting to systematic pelvic examination instituted after the period of normal involution had passed, a step forward would be made in fighting so insidious a foe. Even if only those cases in which slight irregularities occurred during the puerperium were subsequently examined, much future trouble would be averted. A careful aseptic curettage, with the establishment of good drainage from the uterine cavity, at this stage, would undoubtedly be efficacious in preventing many a subsequent dangerous and mutilating operation.

The second lesson if short, is emphatic. It applies to the emptying of the uterus in abortion at the very earliest opportunity. If the principles which govern modern gynæcological practice are correct no sound argument can be adduced in favour of waiting on nature to complete the abortion. No doubt nature is quite capable of so simple a matter as evacuating the uterus, but as our knowledge of modern pathology tells us, she calls to her aid certain agents whose actions she cannot always control.

The third lesson to be drawn from the consideration of these few points is that an apparently quiescent salpingitis may become reinfected through adhesions to intestine. The woman with such a pelvic condition is never safe while she retains her damaged tubes.

Reflection on these cases of pelvic inflammation brings the conviction that many are in a sense preventable, and moreover that we possess two lines of defence. The first entails greater care during parturition as to aseptic technique and closer observation of the puerperium whereby the incidence of a mild sepsis may be prevented. The second line may be regarded as establishing the custom of post-puerperal examination, especially where any irregularity in temperature, pulse rate, and condition of the lochia has been noted. By these means I believe we shall help to bring gynæcology into line with other departments of medical practice where the prevention of gross and other irreparable disease is the ideal aim.

Brilliant as the achievements of gynæcological surgery have been during the past twenty years in saving life and restoring the invalid to health, it must not be forgotten that these results have been attained by methods crude in themselves and destructive of physiological function. That this is recognised in some measure by a number of pelvic surgeons, the various plastic procedures on damaged tubes and resections of ovaries bear witness. These so-called conservative operations must at best be classified as experimental, and we have to confess that at present we lack any systematized scheme calculated to restore the physiological integrity of these important organs. Is not the time approaching when it will be incumbent on us to seek out the prime causes of the gross lesion and thereby prevent destruction of physiological function?

Two Cases of Primary Carcinoma of the Female Urethra.

By Florence N. Boyd, M.D.,
Senior Surgeon to the New Hospital for Women.

Case I. Mrs. S., aged 51, was admitted to the New Hospital for women on May 11th, 1901. For 6 months she had had pain about the vulva which was not felt specially on micturition, although micturition had been becoming more frequent. For the same time she had noticed a "lump" near the urethral orifice; this had been increasing in size and was accompanied by a discharge of blood and pus. All these symptoms became much aggravated about 3 weeks before admission.

On admission she was noted to be thin, anæmic, and cachectic. Her organs generally were sound. The orifice of the urethra was rendered prominent and thrown forward by a growth seen, through the stretched urethral orifice, to be as large as the end of the index finger. From the vagina the urethro-vaginal septum was felt to be hard, thickened, and infiltrated in about half its length. There were no enlarged glands in the groins. An attempt to pass a glass catheter was unsuccessful and caused bleeding, but a rubber catheter passed after a little manipulation and drew off clear urine, free from blood and containing a faint cloud of albumin.

On May 16th, the growth was removed. An attempt to pass the catheter and thus define the urethra failed, and it was thought that the growth must be completely annular, but afterwards it was seen that this was not so. The channel of the urethra ran a somewhat tortuous course to the left of the growth, which was situated on its right and posterior walls, and the point of the catheter caught in the growth. The anterior vaginal wall being exposed, an elliptical area was marked out, including the meatus and growth and going well beyond the infiltrated area of the vaginal wall. Its posterior or upper angle was 2—2½ ins. up the vagina, its anterior angle just behind the clitoris. The mucous membrane having been deeply incised, the urethra and growth were dissected free. The urethra was split to ascertain the limits of the growth, and, as it appeared that the section ran rather near the growth on the right of the vagina, more tissue was cut away here. About ¼—½ in. of the urethra appeared to

be left. Two buried stitches fixed it beneath the pubic arch; the mucous membrane of the vagina behind was united to that of the nymphæ in front by catgut stitches, while the urethral mucous membrane itself was held to the surrounding mucous membrane by two or three interrupted sutures; a soft catheter was tied into the bladder. Healing took place well posteriorly, anteriorly there was a little sloughing.

From the first, a little urine escaped along the catheter, but after this was removed on the 7th day, there was hardly any incontinence. Later, however, a certain amount of incontinence developed and necessitated the wearing of a urinal.

The opening of the urethra, when healing was complete, was within the vagina, and was directed downwards and backwards, so that all valvular action was lost. I tried various kinds of pessaries, hoping to press the posterior wall upon the anterior and thus prevent the flow of urine, but they were not successful.

Six months later, not more than $\frac{1}{8}$th of an inch of urethra remained, its orifice admitted the tip of the little finger, and some prolapse of the mucous membrane was present. By day, incontinence was complete.

This patient was seen again on November 22nd, 1905. She had gained flesh and looked well. There was no recurrence of the growth, but cicatricial tissue held the orifice of the urethra on the left side to the pubic ramus. An index finger passed directly into the bladder without encountering any sphincteric resistance. The bladder mucous membrane prolapsed anteriorly, forming a mass the size of a small cherry. There was practically complete incontinence both by day and night.

In spite of the discomfort of this condition, the patient is unwilling to submit to a further operation with a view to freeing and narrowing the urethral orifice, or, possibly closing it and establishing a permanent supra-pubic opening.

The specimen showed a sessile growth occupying the posterior and right lateral walls of the anterior half of the urethra. In its fresh state the growth showed an ulcerating area, at the upper limit of which was a polypoid mass, torn off in removal. The piece of urethra excised measured 2 ins., and as some $\frac{1}{4}$ in. was left, it will be seen that the growth had both distended and elongated the urethra.

The specimen is thus described by Mr. Shattock in the catalogue of the Royal College of Surgeons:—"The chief parts of a female urethra, wanting the vesical extremity. On the right and posterior aspects it is the seat of a carcinomatous growth which in part projects

into the canal—itself correspondingly dilated. The projecting portion of the growth is in places smooth on the surface and elsewhere resolvable into coarse papillary processes. A track of the vaginal mucosa remains on the back of the specimen. Histologically, the growth is a columnar-celled carcinoma, the columnar cells being uninvested with any flatter series. The channels of the tumour are in places lowly papilliferous."

This seems to be a case of true primary carcinoma starting in the deeper part of the urethra. Both the mucous glands of the urethra and Skene's ducts are lined with cylindrical cells, and it is probable that the growth took its origin in one of these structures. Mr. Battle's second case referred to below showed an exactly similar microscopic structure.

Case II. Mrs. H., aged 51, was admitted to the New Hospital for Women on July 21st, 1905. Nine months previously she was operated on at the Soho Hospital for Women for ovarian tumour. After the operation she had slight irritation about the vulva which persisted after she left the Hospital. For six months the patient had had pain and burning on micturition; the pain came on during, and lasted for three to five minutes after, micturition. Three months ago slight hæmorrhage began and lasted about two months. There had sometimes been blood in the urine. For three months micturition had been increasing in frequency. It now occurred every hour at night, but less often when the patient was up.

Twenty-eight years previously she had been treated in Derby Infirmary for lupus of the nose, and was scarred by it. There was now a suspicious patch over the right lower jaw. She was anæmic and feeble-looking, but her organs generally were sound. The abdomen was lax and the *recti* gaping beneath the ovariotomy scar. In the left inguinal region was felt a large, hard lymphatic gland, and smaller ones could be felt on the right side.

On separating the *labia* a red, ulcerated growth was seen, involving the orifice and posterior wall of the urethra throughout nearly the whole of its extent, and infiltrating the adjacent anterior vaginal wall as well as the tissue of the *fossa navicularis* beneath the pubic arch. It formed a hard, excessively tender mass, the size of a walnut, of which the part surrounding the orifice of the urethra bled readily on touch. The clitoris was not involved.

Operation took place on July 24th, 1905; a catheter was passed with difficulty before operation, and 19½ fluid ozs. of urine were drawn off, although the patient had passed urine just before being

placed on the table, so that there appeared to be some obstruction from the growth. As I anticipated that it might be necessary to excise the whole urethra into the base of the bladder and to close the lower opening by suture, I began by doing a supra-pubic cystotomy and fixing a rubber drainage tube into the opening. This made it seem advisable to delay the extirpation of glands until the supra-pubic drainage could be controlled, and the extirpation of the growth was proceeded with. With the patient in the lithotomy position, an incision was made on each side, beginning at the apex of the vulvar cleft in front of the clitoris and carried backwards along the nymphæ to the mid-lateral point of the vaginal opening. All the tissues including the clitoris were reflected downwards from the pubic arch, the *crura clitoridis* were divided close to the bone, and the lateral attachments of the urethra and vagina freed. The vagina was then incised transversely well above the infiltrating growth, and lateral longitudinal cuts were carried from the ends of the transverse incision down to the *introitus*. The urethra was now allowed to drop away from the pubic arch and the neck of the bladder was exposed. It was found that the vesical end of the urethra was free from growth, so this canal was divided about a $\frac{1}{4}$ of an inch from its proximal end, and the whole mass of tissue included within the incisions removed. Bleeding was free but was easily controlled by ligature and under-sewing. Examination with the finger showed a definite contractile muscular ring remaining, and it was therefore decided to fix the cut urethra in the wound in the hope that the patient would retain natural control over micturition. The urethra was stitched to the posterior vaginal wall by interrupted catgut sutures, and to the sub-pubic ligament by a stitch not passing through the mucous membrane. The large wound was covered by approximation of parts and by turning in of flaps from the *labia*, except a small triangular area in front of the urethra over the *symphysis pubis*.

On examining the specimen, it was seen that the growth involved the orifice and the posterior and lateral walls of the urethra, the anterior wall remaining free. Histologically, it had the structure of a squamous-celled carcinoma, and this, combined with the infiltration of the sub-pubic tissues immediately outside the urethra, suggests that it belongs to the group of peri-urethral or vulvo-urethral growths which are stated by Winckel to start as nodules in the vestibule and to extend up along the peri-urethral connective tissue, invading the mucous membrane of the canal only after necrosis and ulceration of the growth have occurred. A true primary squamous carcinoma may start also within the urethra itself from the mucous membrane,

and the orifice and vestibule become involved by extension. As ulceration had already occurred in this case, it is difficult to say certainly which was the mode of origin here.

With regard to the after-course, the patient was kept prone, and the urine was drained off supra-pubically through a long tube into a bottle, the abdominal wound being thus kept nearly dry. The urine remained acid and there was no evidence of leakage *per urethram*. On the 8th day a catheter was passed and the bladder washed through from the supra-pubic opening. At the end of a fortnight a clamp was placed temporarily on the supra-pubic tube by day, and the patient encouraged to pass her urine naturally at frequent intervals. This she succeeded in doing, and in emptying the bladder by this route, the supra-pubic tube was therefore withdrawn permanently. After this the patient had at first incontinence as well as leakage through the supra-pubic opening, but this improved in a day or two, and she could hold her water for two hours with very slight dribbling in between. On August 17th, when the supra-pubic wound into the bladder had closed and the wound was rapidly granulating, the inguinal glands were removed. The large, hard one, on the left side, was found to be suppurating. This, under the microscope, showed no new growth, while the four small glands removed from the right side all showed secondary growth of squamous-celled carcinoma.

The patient was discharged on September 9th, the inguinal wounds having healed by first intention. The vulvar wound was healed, the supra-pubic wound very nearly so. The patient was passing water about every two hours, never more than 4 fluid ozs. at a time. She was conscious of the need to pass water and of the act of micturition, but there was slight leakage between times, the amount varying without obvious cause. She was, however, quite comfortable, wearing a pad which had sometimes to be changed twice in the day.

As cicatrization proceeded, however, this good result did not continue. By the beginning of October, there was complete incontinence. There was no recurrence of growth, and on passing a catheter 2 fluid ozs. of urine were found in the bladder.

Cases of primary cancer of the urethra, both the true urethral and the vulvo-urethral forms, are sufficiently rare to make it worth while to report any undoubted cases, and the first case has the additional interest of having remained free from recurrence for $4\frac{1}{2}$ years after excision. These cases seem to afford also some further guidance as to the best method of treatment. In both of them, where a small portion of the urethra could be left, the immediate result of operation

was fairly satisfactory as to control over micturition, and in both this control was progressively lost. In neither did any stricturing of the transversely divided urethra occur, but the remaining portion of the urethra shortened longitudinally, leaving a gaping opening directly into the bladder which allowed mucous membrane to prolapse, and all valvular, as well as sphincteric action was lost. This, however, has not been the case in some of the instances previously reported. Thomas, in reporting his case to the New York Obstetrical Society (*Amer. Journ. of Obstet.*, 1877, p. 114), expressly stated that he had expected incontinence to follow, as he thought he had removed all the sphincteric apparatus, but that he was agreeably surprised to find that the patient retained complete control even after assuming the upright position. Professor Kynoch, in his case reported to the Edinburgh Obstetrical Society, May 8th 1901, found that control was retained for 3 months after removal of the anterior two-thirds of the urethra, and that the incontinence which then supervened was due to extension of the disease backwards. Fritsch (*Veit's Handbuch*) recommends wide excision of the urethra in these cases, and says that even if the neck of the bladder has to be encroached upon he has found that quite a good functional result may be expected as the result of cicatrization, and that he has seen it in several cases. In this connection it is worth noting that Thomas removed the urethra with the galvano-cautery, and therefore probably got some stricturing of the urethra. Possibly it was a mistake to endeavour to obtain primary union of the urethral to the vaginal and vestibular mucosa.

These two cases tend to show that when it is necessary to remove the urethra above the triangular ligament (*i.e.*, above the level of the *constrictor urethræ*) closure of the urethra and supra-pubic drainage seem likely to afford the patient greater comfort. This was the plan adopted and advocated by McGill (*Lancet*, November 8th, 1890), Zweifel (*Central. für Gynäkol.*, 1893), Battle (*Lancet*, June 15th, 1895 and July 13th, 1901), and others. In all these cases the disease had extended to the neck of the bladder and consequently there was no question of the possibility of leaving any kind of sphincteric control. The closure of the lower opening was ultimately complete, and the supra-pubic drainage satisfactory to the patient. I had this plan well in mind for my second case, but there seemed to be such definite contractile power left that I hoped against my former experience for good control *per viam naturalem*. A secondary operation might remedy the mistake, but as the glands excised were found to be already infiltrated with cancer it is desirable to wait a short period before deciding on this course.

REVIEW OF CURRENT LITERATURE.

OBSTETRICS.

Pyelonephritis in Pregnancy.

JEANNIN et CATHALA. *Bulletin de la Soc. d'Obstét. de Paris*, June, 1905.

GUÉNIOT (PAUL). *Bulletin de la Soc. d'Obstét. de Paris*, July, 1905.

JEANNIN and Cathala report a case of double pyelonephritis, which ended fatally, but was so obscure during its course that the diagnosis was not made until the autopsy. When admitted the patient was in a state of stupor, suffering from severe headache with violent exacerbations, raised temperature, rapid pulse, and constipation for 15 days. Aperients led to the passage of abundant fæces, with fœtid odour, but no improvement in the condition of the patient. The urine contained no albumen, and no pus. There was some optic neuritis, especially on the left side, and there were several small retinal hæmorrhages close to the left papilla. A week after admission complete incontinence of urine and fæces was noted. Meanwhile signs of bronchopneumonia had appeared at the base of the right lung. Death occurred three weeks from the date of admission.

At the autopsy the kidneys were seen to be voluminous, and when the ureters were cut to enucleate the organs, a great quantity of purulent fluid escaped from the pelves. On section abscesses were seen to be present both in the cortices and in the pyramids, and the calices and pelves were dilated, and contained purulent urine. The condition was shown microscopically to be due to a pure infection by the colon bacillus.

In their comment on the case, the authors say:—"The intestinal troubles that the patient presented at her entrance to the clinic seem to have been the origin of this infection." The secondary localisation in the kidneys is attributed to the low condition of the organs produced in pregnancy by compression and subsequent distension of the ureters. At the time when the urine was examined, and neither albumen nor pus was present, they suppose suppuration had not occurred, and that the subsequent incontinence of urine prevented them from observing its condition during the last fortnight, and so

obscured the diagnosis. They suggest that the broncho-pneumonia of the right lung may have been due to another localisation of the infection by the colon bacillus, but admit that the microscopical sections did not reveal the presence of the organism.

Guéniot reports two cases of pyelonephritis in the first half of pregnancy, in both of which the condition was at first mistaken for threatened abortion. As he states, there is a great temptation to make this diagnosis when a woman is admitted to the clinic in the third or fourth month of pregnancy complaining of great pain in the abdomen, and if there is a rise of temperature one is tempted to attribute this to infection of the ovum or the uterus, and may even be inclined to question whether there may not have been an attempt at criminal induction.

A more careful examination led in both cases to a rapid revision of this early diagnosis. The pains were soon seen not to have the character of those of uterine contraction, and to be seated in the lumbar region. Moreover pressure at this point was painful, and at this point only. In neither case did the urine at this early stage appear thick, pus not being present to the naked eye, but in one case at least albumen was present (its presence is not noted in the second case), and upon centrifugalisation and microscopic examination pus globules and abundant micro-organisms were seen to be present. Later on pus appeared in the urine in considerable quantity, easily apparent to the naked eye, and it is interesting that at this stage the abdominal pain and fever were much less marked (in one case absent), whilst in the pre-suppurative stage they had been the most striking feature of the cases.

It is, of course, important that the diagnosis should be made in this pre-suppurative stage, and the points on which Guéniot lays stress are:—

1. The character of the pain, continuous and not intermittent, as are the uterine contractions.

2. Its seat in the lumbar region, and the fact that it can be awakened by pressure over the kidney.

3. The centrifugalisation of the urine, which facilitates the discovery of small quantities of pus, or the presence of bacteria.

The treatment consisted of milk diet, at first rigid, but subsequently modified, dry cupping and laudanum compresses in the kidney region, urotropine, and free purgation. Both cases improved, but are reported before the termination of the disease or the pregnancy.

R. Hamilton Bell.

Twin Placenta with a Single Amniotic Cavity.

PFEILSTICKER (WALTER). *Zentral. für Gynäkol.*, 1905. No. 49, p. 1499.

THE patient, who was deaf and dumb, was delivered for the third time on October 10th, 1905. Twin girls were born, both in the second vertex position. The cord of the first and larger child was compressed by the head of the second, so that it died of asphyxia after delivery in spite of every effort to save it. The second child was born five minutes after the first, and after five minutes more the placenta was expressed. The placenta and membranes were complete. The two cords were separated by an interval 2 c.m. wide. Between the cords there was a crest of amniotic tissue which formed a large segment of a ring on the inner surface of the amniotic bag. It did not, however, extend to the distal part of the membranes. This crest was 5 c.m. high where it was most marked. It was composed of two layers of amnion. Microscopical examination satisfied the author that the edge of this crest showed that the amnion had been torn. The writer comes to the most natural conclusion that the crest spoken of corresponds to an original division between two primarily distinct amniotic sacs, and adds that even with a double-yolked ovum there would not be a primary common amniotic sac for the two fœtuses.

CUTHBERT LOCKYER.

Œdema of the Lungs complicating Pregnancy.

POULIOT. *Annals of Gynæcology and Pediatry*, October, 1905.

ALTHOUGH women suffering with cardiac legions may, and frequently do, bear children without notable aggravation of their malady, yet too often serious symptoms are encountered, and one of the serious complications, short of actual death, is encountered in acute or sub-acute pulmonary œdema. The attack may come on when the woman is in a condition of comparatively good health, having felt for only a few days or hours some symptoms which indicate embarrassment of the pulmonary circulation; then, after the efforts of child-birth with the arterial hypertension of delivery, there is developed a crisis of pulmonary œdema. The attack begins with suffocation and terrible dyspnœa. The attack strikingly resembles cardiac asthma, but there are some essential differences. The respiration is rapid but easily performed, the breathing is hurried rather than difficult, the patient experiences a sensation of heat behind the sternum and then of

tickling in the back of the pharynx which causes a croupy cough ending in expectoration, the capital symptom of the crisis of pulmonary œdema. The expectoration consists of white or pink foam, at first small in quantity and then by degrees floods of foaming liquid are expelled from the mouth and even from the nose as if by regurgitation. At times there may be a basin full of this liquid which settles into two layers—an upper one consisting of serum mingled with air and coloured with blood and a lower of ropy yellowish sticky liquid rarely coloured. On auscultation of the chest râles are detected, and on palpation there is dulness, and the apex of the heart is very low down and at the outside of the axillary line. By the time the patient has finished expectorating she is greatly fatigued, but by degrees her health is re-established, or she may die asphyxiated in an attack of acute pulmonary œdema, or she may die of prostration and exhaustion. The patient may have several attacks. The condition is due to the hypertension of the lesser circulation resulting from a very narrow mitral stenosis. It is also probable that the pulmonary œdema is partly a manifestation of the toxæmia of pregnancy caused by want of elimination of the toxic products by kidneys more or less diseased. The patient should be treated by inhalations of ether and by injections of camphorated oil of 10 per cent. The evacuation of the liquid may be aided by ipecacuanha and tartar emectic, but bleeding gives the best result; dry cups may be applied over the back and chest. Premature labour must never be induced during an attack of pulmonary œdema, for the period of expulsion and especially that of delivery constitute a very grave danger for the patient.

COMYNS BERKELEY.

The Excretion of Acetone and Diacetic Acid in a case of Pernicious Vomiting of Pregnancy.

BALDWIN (HELEN). *The Amer. Journ. of the Med. Sci.*, Oct., 1905. Vol. cxxx., No. 4.

THE degeneration in the liver noted by Ewing (*Amer. Journ. Obstet.*, 1905, vol. li.) in cases of hyperemesis gravidarum and eclampsia suggested to the authoress that in these conditions there might be found urinary changes due to the breaking down of the proteid molecule and to the associated disturbance of function of the liver cells. The histological alterations in these cases are similar to those in phosphorus poisoning, where the urine contains pathological

organic acids and acetone. In phosphorus poisoning the oxidation of the body is greatly diminished. Leucin and tyrosin have been found in the urine in cases of pernicious vomiting and phosphorus poisoning.

The authoress reports a case of pernicious vomiting of pregnancy in which acetone was associated in the urine with at least one organic acid, namely diacetic. The case was also interesting from the evidences which it gives of a high degree of intestinal putrefaction, by the excretion in the urine of large amounts of phenol, indol, and combined sulphuric acid.

While the presence of acetone is not of so much significance as that of diacetic acid, its persistence and increase would indicate that the toxæmia was becoming more grave.

Abortion had to be induced to save the patient's life, vomiting at once ceasing. The diacetic acid and acetone disappeared very promptly after the uterus was emptied.

COMYNS BERKELEY.

Puerperal Sepsis in Private Practice.

Intercolonial Medical Journal of Australasia, October 20th, 1905.

A SUB-COMMITTEE was appointed by the Medical Society of Victoria to report on "puerperal sepsis" in private practice. The following is an abstract of this important report:—

CAUSES OF PUERPERAL SEPSIS.

The direct cause, by consensus of evidence, is shown to be the introduction of infective material into the patient's genital canal by the person or persons attending the confinement.

In some of the most virulent cases of infection fœtor of the lochia may be absent, and only careful bacteriological examination can prove the origin and nature of the infecting micro-organism.

Indirect causes are (1) unnecessary vaginal examinations; (2) retained pieces of placenta, membrane, or clots, accidents which frequently result from injudicious management and hurrying of the third stage of labour; (3) traumatism, and on the other hand unduly prolonged labour; (4) post-partum hæmorrhage; and (5) diminished powers of resistance, due to general causes, such as syphilis, gonorrhœa, tuberculosis, renal disease, alcohol, acute fevers, etc.

PREVENTABILITY.

Abdominal palpation should always be employed, and vaginal examination only when necessary.

One of the most essential of the nurse's duties, and one very likely to be omitted, is the rendering of the patient's external genitalia and neighbouring skin surgically clean.

A clean linen gown is strongly recommended to medical practitioners as well as to nurses.

All instruments, gowns, towels, gloves, etc., should be sterilized for each individual case, and if possible at the house of the patient.

All lesions of the perineum and external genitalia should be searched for and immediately repaired.

The sub-committee finally deal with the question of obstetric nurses and midwives, and state "that one of the very first steps in the preventability of puerperal sepsis is to insist upon the proper training and subsequent examination and registration of all women who are to act as obstetric nurses or midwives." They are "most strongly convinced of the necessity of an Act of Parliament, on the lines of the 'English Midwives Act, 1902,' or the New Zealand Act, which makes it a penal offence for any woman to act as an obstetric nurse or midwife unless specially trained, examined, and registered."

It should be added that when the report was presented to the Medical Society of Victoria some objection was taken to the first clause (quoted in full above) as being too absolute, and leaving no room for the rare cases of infection from the patient's clothing, vagina, etc. It was fully admitted at the same time that in the great majority of cases the attendant was the introducer of the infective material. It was stated that the sub-committee would reconsider the clause objected to in the report, and would possibly modify it in the direction suggested.

R. HAMILTON BELL.

A Study of Brachial Birth Palsy.

CLARK (L. P.), TAYLOR (A. S.) and PROUT (T. P.). *American Journ. of the Medical Sciences*, October, 1905.

IN this paper the writers draw the following conclusions:—

1. The cause of the laceration type of birth palsy is tension on the nerve trunks, which first ruptures the nerve sheath and then the nerve fibres. The prevention of this serious lesion of the cervical

nerve trunks rests with the obstetrician, who should not overstretch the child's neck in the process of delivery.

2. The persistence of the palsy is clearly explained by the pathological findings, viz. (*a*) rupture of the perineural sheath with hæmorrhage into its substance, resulting in the formation of hæmatomata or hæmatomatous infiltration into the neighbouring tissues; (*b*) the cicatricial contraction following organisation of the blood-clot and repair of the rent in the perineural sheath. The connective tissue thus formed indents and presses upon the nerve bundles, strangulating them and preventing regeneration of the nerve fibres. In some instances the same result is accomplished by the turning inward of the perineural sheath upon the nerve bundles.

3. The nature of the lesion in all cases demands excision of the damaged areas and suture of the divided ends as soon as it is proved that spontaneous repair will not take place. The plan of treatment is then the same as that for peripheral nerve injuries elsewhere.

4. In all cases such treatment as will prevent contractures and deformities and maintain muscle tone in the paralysed limb should be systematically used until either spontaneous recovery occurs or an operation is done. (Traumatic neuritis is a contra-indication to active treatment.) It is obvious that the above measures should be continued after operation.

5. The proper time for surgical interference cannot yet be definitely stated. It appears, however, to be much later than two or three months after birth, as advised in Kennedy's report. At the present time one year would seem to be a reasonable delay before operation.

6. Sufficient time has not elapsed in the majority of the cases in this series for the final results to be known.

FRANK E. TAYLOR.

Surgical Intervention for the Intra-cranial Hæmorrhages of the New-born.

CUSHING (H.). *The American Journ. of the Medical Sciences*, October, 1905.

THE writer records his experience of trephining for intra-cranial hæmorrhage in the new-born. He has performed the operation four times with two successes. He is of the opinion that "at the time of onset the indications for immediate surgical intervention are as definite in many of these cases as they are when corresponding symptoms are unmistakably the result of a traumatic hæmorrhage

occurring in adult life." A more careful study of the symptomatology of these cases is necessary, so that the condition may be recognised earlier and immediate operation may be undertaken for their relief, and possibly to ward off the consequences of the hæmorrhage, such as spastic paraplegia, diplegia, epilepsy, amentia, etc. Cushing states that, with proper regard for hæmostasis and careful avoidance of exposure, a new-born child will stand a cranial operation well. He also says: "If it can be demonstrated that a craniotomy on the new-born child, when conducted with due precaution and delicacy of manipulation, is comparatively free from danger, I believe the immediate risk of death and the sorry late consequences of meningeal birth hæmorrhages may be avoided in many cases by surgical interference." He also believes that these explorations will lead to a better understanding of the pathology of this group of diseases in their early stages.

FRANK E. TAYLOR.

GYNÆCOLOGY.

Endothelioma of the Ovary.

BARBOUR. *The Scottish Medical and Surgical Journal*, Dec., 1905.

IN July, 1905, Dr. Barbour brought before the Edinburgh Obstetrical Society two ovarian tumours, which, on microscopical examination, proved to belong to the rare variety of endothelioma, to which attention has only been directed during recent years. The first case was from a woman aged 42, who had had four children, and had complained of pain in the epigastric region for two years, and of a swelling in both iliac regions for six months. About a fortnight after the birth of her last child, three years ago, she had a severe rigor, accompanied by pain in the epigastrium and vomiting. The vomiting continued for about three weeks and the pain up to the time of the operation had never ceased. Two months before the operation the vomiting recurred, and about this time she passed blood from the bowels. Menstruation did not return after the birth of her last child. On examination two firm nodular and freely mobile tumours were detected. There was no distinct evidence of ascites. The tumours were removed without any difficulty, there being no adhesions of any consequence, but the peritoneum was found to be infiltrated with malignant growth. She died on the fifth day after the abdominal section from symptoms of intestinal obstruction. On

rectal examination a nodule was found in the wall of the bowel above the level of the sacral promontory. Owing to the weakness of the patient and the malignant infiltration of the peritoneum it was deemed undesirable to re-open the abdomen. A full account is given of the microscopical appearances, and there are micro-photographs showing the structure. Of recent years a special form of sarcoma has been described under the term of endothelioma in which the sarcomatous cells are traced to the endothelium of the lymphatics or blood-vessels, hence the term endothelioma. From the fact that the cells originate from the endothelium and resemble in character those found in carcinoma, probably many tumours which have been described as carcinoma of the ovary belong to this class, so that there are as yet no exact data as to their frequency. The first case was described by Leopold in 1874 (*Arch. für Gynäkol.*, 1874, s. 189), and the first detailed description is in a paper by Pick (*Berl. klin. Woch.*, 1894, Nos. 45, 46), in which he describes three types. Since then numerous cases have been described, and the author has collected a total of 70. The disease is most common between 40 and 50; as a rule the tumour grows fairly quickly, and in 22 per cent. the condition is bilateral. Its malignancy varies, and cases have been recorded as non-recurrent many years after operation. Endothelioma has been described in the body of the uterus; 10 cases have been described in the cervix and recently one was seen in the labium majus.

COMYNS BERKELEY.

The Hæmorrhages of Twisted Ovarian Cysts.

DANIEL (C.). *Revue de Chirurgie*, October, 1905.

THE writer records two cases of twisted ovarian cysts complicated by hæmorrhage. He has also collected 41 cases from the literature, brief descriptions of all these cases being found at the end of the paper. From a careful study of these 43 cases he concludes that in the classification of ovarian cysts, hæmorrhagic cysts, on account of their clinical and anatomical characters, should be considered separately, as are colloid, dermoid and purulent cysts.

The anatomical changes in the cyst, in the pedicle, in the peritoneum, and in the neighbouring organs are separately and fully described. Hæmorrhage into the cyst occurs in about half the number of ovarian cysts in which torsion of the pedicle has occurred. This complication often gives rise to urgent symptoms, which necessitate immediate surgical intervention. The signs vary with the abundance of the

hæmorrhage, whether slight, repeated, severe, or fulminant, and with the site of the hæmorrhage, whether parietal, intra-cystic, total, or mixed, i.e., both cystic and peritoneal at the same time. The diagnosis is easy when the hæmorrhage is severe and has produced signs of internal hæmorrhage. When, however, the hæmorrhage is slight, it may only be ascertained after operation.

The treatment consists in removal of the cyst by laparotomy without delay. The same treatment is advised when the condition occurs in pregnancy or during the puerperium, and all danger of prematurely interrupting the pregnancy is stated to be avoided by the systematic employment of subcutaneous injections of morphine for some days subsequent to operation.

FRANK E. TAYLOR.

An Unusual Case of Sarcoma of the Uterus.

VON WENCZEL. *Zentral. für Gynäkol.*, 1905. No. 49, p. 1501.

REFERRING to the rarity of authentic cases of sarcoma uteri, the author quotes the following statistics. Gurlt's record of 2,649 uterine growths which included 1,571 carcinomata, 883 fibro-myomata, and only *two sarcomata*. Roger Williams mentions that in a series of 4,115 tumours of the uterus there were only *eight* sarcomata. Poschmann gives the proportion of carcinoma uteri to sarcoma uteri as 21 : 1.

The site of election of sarcoma is the corpus uteri. Poschmann found 377 carcinomata of the cervix to 10 in the body of the uterus, and 11 sarcomata of the body to five of the cervix uteri. Krukenberg found 19 sarcomata of the corpus uteri to only one of the cervix. In Veit's Gynäkologie, Gessner puts the proportion as 8 to 1.

Sarcoma of the uterus is found to arise 1½ times more frequently in the mucosa than in the fibro-muscular wall. Sarcoma in the fibro-muscular tissue usually arises from a primary fibro-myoma. Primary sarcoma of the fibro-muscular tissue of the uterus is so rare that a single observer will not meet with it more than once in fifteen years. It is generally of the spindle-celled type, this kind being, according to Gessner, four times as frequent as the round-celled variety. Of round-celled sarcomata the small-celled type is much rarer than the large round-celled variety. The author's case is as follows:—

The patient was aged 46 years. Menstruation began at 19 years, and until two years ago was regular and not excessive. For two years she had suffered from metrorrhagia with alternating leucorrhœa.

There were two children, the youngest being eight years of age. Since the last delivery the patient suffered from prolapse and sacral pain. On examination there was prolapse of both vaginal walls on straining. The cervix was the seat of a new growth, round in shape, the size of a child's fist, of soft consistence, and covered (except for a small area) with mucous membrane. The cervical canal admitted the finger tip; the fundus was anteflexed and mobile. A creamy discharge escaped from the os. The cervix was amputated, and the corpus uteri curetted. The cervical growth was found to be a sarcoma, and total vaginal hysterectomy was performed two weeks later. The patient made a smooth recovery.

Macroscopically, the growth presented no special characteristics. Microscopically, it was found to be made up of small round cells. The mucosa was infiltrated by inflammatory cells. Neither in the tumour nor elsewhere in the uterus was there a trace of fibro-myoma. Since the mucosa was only inflamed the growth was regarded as springing from the fibro-muscular tissues. The tumour was in fact a small round-celled sarcoma of the wall of the cervix uteri.

CUTHBERT LOCKYER.

The Byrne Operation and its Application in the Radical Treatment of Cancer of the Uterus.

WERDER (H. O.). *Amer. Journ. Obstet.*, November, 1905.

IN 1888 Byrne published a series of cases of carcinoma of the uterus which he had treated by a new method. He thus described the operation:—"A double tenaculum forceps was passed well up the cervical canal, and when opened the uterus was so well held, that any degree of traction could be steadily maintained. A circular groove close to the vaginal insertion of the cervix was next made by the cautery knife for the reception of a platinum loop. The wire being now adjusted and firm traction kept up, the loop was contracted at proper intervals until the part embraced was severed. A sharp curette was next passed into the uterine cavity and the latter was thoroughly scraped out. Sufficient space having thus been made for another electrode having a larger cauterizing area, the interior was gone over so as to destroy all loosened and diseased tissue with which it might come in contact. The cavity was now sponged out very carefully and a tampon, soaked in acetic acid and tannin, applied for a few minutes so as to prepare the parts for the next and perhaps most important step in the operation. A dome-shaped cautery instrument, brought to a cherry-red heat, was applied to the excavation in every part, and

when withdrawn the cavity was sponged out, dried, and again cauterized until the parts were completely charred and black." Byrne claimed to have performed this operation in 367 cases of cancer of the uterus without any operative mortality, and at the end of five years 19 per cent. of the patients were said to be still alive. He writes:— "I have never known an instance of relapse in which the disease had returned in the part from which it had been excised. I have repeatedly observed the return of the disease in the fundus, ovaries, or some of the adjacent tissues, but I have never known a single instance in which the disease has reappeared on or very close to the cauterized surface from which the cervix had been removed by the galvano-cautery."

Werder has modified this operation, and performs vaginal hysterectomy instead of amputation of the cervix. An incision is made around the cervix with a cautery knife, and a dissection carried up carefully between the bladder and uterus. With the aid of the index finger the peritoneum is then reached, and the anterior pouch opened with blunt scissors. Douglas's pouch is opened in a similar manner and the lateral vaginal attachments are burned through. The bladder is widely separated from the uterus and broad ligaments, and the fundus uteri brought down through the anterior incision. Heavy clamps are then applied to the broad ligament, two on each side, and the uterus and its appendages removed. Subsequently an electro-thermic clamp is placed on the broad ligaments external to those previously applied, "and the tissues thoroughly cooked until a good ribbon is obtained." The electro-thermic clamp is then removed, the ribbon cut through near its inner end, watched for a few minutes to see if bleeding occur, and if not, dropped.

The author has employed the operation in sixteen cases; one patient died of uræmia four weeks after the operation, the others recovered. No after histories of the patients are given.

HERBERT WILLIAMSON.

The Operative Treatment of Retro-displacements, with a New Operation: Intramural Transplantation of the Round Ligaments.

BARRETT (CHANNING W.). *Surgery, Gynæcology and Obstetrics*, November, 1905.

AFTER fully discussing the subject the author describes his new operation.

The abdomen is opened in the middle line, and any complications are first dealt with. The round ligaments are then picked up with the

author's rubber-jaw forceps, and a control ligature thrown round each ligament at about $1\frac{1}{4}$ to $2\frac{1}{2}$ inches from the angle of the uterus. If the ligaments are well developed the peritoneum over them is slit and not included. Close to the lower end of the wound the edge of the aponeurosis over the rectus muscle is grasped, and curved ligature forceps are pushed between the aponeurosis and muscle outwards to the point of exit of the round ligament, the internal ring. The instrument is now guided into the abdomen by sight or touch, and made to follow the round ligament to the control ligature which is grasped and withdrawn, carrying with it a loop of the round ligament. Each loop of the round ligament is sewed to the underside of the aponeurosis with catgut about one inch from the median line, and if the loops are long enough they are sutured together in the middle line over the recti muscles.

By this operation the author claims that there is no opening left for strangulation of the bowel and that the ligament leaves the abdomen at its natural place and utilises normal structures as a pulley. Evolution during pregnancy and involution afterwards are not interfered with.

ROBERT JARDINE.

Advantages of "Physiological" Hysteropexy.

GOUIN (G.). *La Gynécologie*, August, 1905.

THE author discusses the various methods of performing ventral fixation and vaginal fixation, and comes to the conclusion that the best method of all is what he calls "physiological" hysteropexy. By this term he means intra-abdominal shortening of the round ligaments, an operation which, "without compressing the nervous plexus which occupies the anterior surface," allows the uterus complete liberty to rise up during pregnancy, and preserves its normal relation with the bladder. Doléris has performed this operation three times on patients during pregnancy with incarceration of the retroverted uterus. All three patients had normal labours at term.

Abdominal and vaginal hysterectomy are anti-physiological and dangerous procedures, which ought not to be used during reproductive life. Shortening of the round ligaments, on the other hand, is a natural and physiological procedure, the operation that should be chosen during reproductive life. It presents the following advantages:—(*a*) It places the uterus in the most favourable position for fecundation; (*b*) it does not hamper the development of the uterus

during pregnancy; (*c*) it cannot cause dystocia; (*d*) its results are lasting, persisting after evolution of one or several pregnancies. Intra-abdominal shortening of the round ligaments has one great advantage over Alexander's operation, in that it allows the appendages to be examined and freed from adhesions, etc.

HENRY RUSSELL ANDREWS.

Prolapse of the Uterus in Virgins and Nulliparæ.

ERTZBISCHOFF. *La Gynécologie*, August, 1905.

IN the new-born, prolapse of the uterus is almost always associated with spina bifida, and is doubtless due to faulty innervation of ligaments and of the contractile walls of the pelvic viscera. In virgins and nulliparæ a want of muscular tone in the perineum and uterine ligaments, sometimes a true muscular aplasia, is the primary cause of prolapse.

Treatment is the same as in multiparæ, but it must be remembered that, as the prolapse is due to a general cause, viz., muscular and ligamentary weakness, suspensory and plastic operations are apt to be followed by relapse. In these cases "kinésithérapie" is most useful.

HENRY RUSSELL ANDREWS.

A Case of Chorio-epithelioma following Hydatidiform Mole.

BURRAGE (W. L.) and LEARY (T.). *Surgery, Gynæcology and Obstetrics*, November, 1905.

THE patient, a iii.-para, æt. 43, was admitted to hospital complaining of pain and flooding. The uterus was about the size of a fourth-month pregnancy, and was retroflexed and incarcerated. The retroflexion was relieved, and 3 weeks later the uterus emptied itself of a large mass of hydatidiform cysts. The patient was dismissed after 3 weeks, but one week later she had a very profuse bleeding which could not be controlled by packing. She was re-admitted to hospital in a very collapsed condition. The uterine cavity was swabbed out with tincture of iodine and packed with gelatine-soaked gauze, and ergot given by the mouth. A week later a curetting was done, when much tissue was obtained accompanied by profuse bleeding. The microscopic examination of the tissue did not absolutely decide that it was a chorio-epithelioma, but radical treatment was decided upon.

The patient was in such a weak condition that operation was delayed for two months. Vaginal hysterectomy was performed with

clamps 3½ months after the delivery of the hydatidiform mole. The uterus was about the size of a 2½ months' pregnancy, and was not adherent. There was no special tendency to hæmorrhage during the operation. The convalescence was uninterrupted. The microscopic examination of the uterus showed that the growth was a typical chorio-epithelioma.

Two years and some months after the operation the patient was quite well.

ROBERT JARDINE.

A Rare Form of Pelvic Tumour.

NYULASY (FRANK A.). *Intercolonial Medical Journal of Australasia*, October 20th, 1905.

THE author reports a case of what he believes to be a cyst of Gartner's duct. The patient was a young married woman, aged twenty-seven. The cervix uteri was found lying up under the pubic arch, with the narrow end of a fluctuating tumour dipping down behind the cervix, and in close contact with it. A distinct fulness in the right iliac fossa could be detected on palpation.

The abdomen was opened by a median incision. There was a little ascitic fluid surrounding the growth, and its peritoneal covering had a dark, deeply-congested appearance. The right Fallopian tube and upper part of the mesosalpinx were quite free from the cyst; the ovary lay on the anterior and outer part of the cyst, but was not attached to it anywhere. The cyst extended right across, behind the uterus, to the opposite side, and lay in contact with the left broad ligament, which was wrapped firmly round it. The left ovary was cystic and the tube converted into a hydrosalpinx. There were multiple adhesions binding the uterus to the left broad ligament and appendages. The tumour itself was situated between the walls of the mesometrium, and was everywhere densely adherent to it. The tumour had, moreover, lifted up the posterior layer of the peritoneum, and there effected some important attachments. The bladder was free from the cyst. The right ureter was flattened out into a broad band, firmly attached to the base of the cyst wall, the peritoneum having been lifted off the ureter by the growing cyst.

The cyst was first emptied, two and a half pints of perfectly clear watery fluid being evacuated, and then removed by a prolonged and careful dissection, many adhesions anteriorly and in the neighbourhood of the ureter requiring division by scissors.

The left Fallopian tube and ovary were subsequently removed, and the abdominal end of the right tube was slit up, and a few silk sutures put in to keep it open, so as to give the patient a possible chance of maternity.

The abdomen was closed without drainage, and the patient made an excellent recovery.

The author quotes some remarks of Bland-Sutton on Gartnerian cysts, as to their intimate relation with uterus, ureter, and bladder, and with the iliac arteries and veins at the brim of the pelvis. He says: "Gartnerian cysts arising in the terminal segment of the duct project into the vagina. In some instances these cysts may be treated sur-

gically through the vagina with greater success than by cœliotomy." Nyulasy's comment is, "For my part, I should like to know what those instances are, and how to differentiate them. In the meantime, and after the experience of my own case, I should view the advice to operate on Gartnerian cysts through the vagina as likely to lead to the most disastrous results."

A photograph and sketch of the removed cyst accompany the paper. We have retained the heading "A rare form of pelvic tumour," for two reasons, first, that it simplifies reference to the original paper, and second, that it does not commit us to the view that the cyst owed its origin to Gartner's duct, which does not appear to us to be clearly and irrefragably established.

R. Hamilton Bell.

The Application of Bier's Stasis Therapy to Gynæcology.

Rudolph (J.). *Zentral. für Gynäkol.*, No. 39; and Eversmann (J.), No. 48, 1905.

Bier's therapy is employed in three ways—(1) by constriction of the parts by means of circular compression; (2) by employing heat; (3) by suction. The last method is better in the treatment of the cervix uteri than the use of circular constriction. Rudolph has devised a means of applying hot air to the cervix; he prefers to use hot air to water and steam, as he considers it is less injurious to the tissues. After fully describing the apparatus which he uses for the purpose, the writer states that by the application of hot air to the cervix he has succeeded in producing absorption of inflammatory bands in the pouch of Douglas. For local action upon a congested cervix the writer uses suction by means of a glass speculum in connection with an air pump, and claims that this method, by the alternate drawing down and relaxation of the uterus produced by the suction, has the effect of massage upon the adnexal structures. By forcible suction, not only the cervix but the adjacent cellular tissues can be drawn into the speculum, and thus a wide field of cellular tissue is brought under influence. This kind of therapy is recommended for inflammatory processes affecting the cervix and corpus uteri. It is suggested that artificial abortion may be induced by its means. Amenorrhœa is said to yield to this treatment. If suction is applied before rapid dilatation of a rigid cervix, it expedites the dilatation of the internal os uteri. J. Eversmann employs the suction method only. He uses a glass speculum closed at one end; near the latter is fused a small glass tube, which can be attached to a rubber tube leading to an air pump. Between the speculum and the pump there is a three-way valve, which is regulated by a stop-cock, and by its means the degree of suction is controlled. By suction, serum and even blood are withdrawn from the cervix, the latter being punctured before the application of the suction-tube if required. This suction treatment is used in all cases of endometritis with profuse discharge. It is kept up for half an hour each day. The apparatus can be used for withdrawing discharges from the cervical canal. Like Rudolph, Eversmann has obtained good results in thickening of the utero-sacral folds. Both writers recommend

this suction treatment in drawing out the nipples of the breasts after labour and for inflammatory conditions of the breasts in the puerperium. It further stimulates the secretion of milk when this is needed.

CUTHBERT LOCKYER.

Technic Employed in the Last One Hundred Laparotomies with the View of Restricting the Employment of Drainage.

HAMMOND (L. J.). *Boston Med. and Surg. Journal*, Nov. 16th, 1905.

IN attempting to obtain the current views on the place of drainage in abdominal surgery, the writer has searched the literature of the past two years, and finds a striking absence of expression of opinion as to its merits. Of 41 opinions collected, 21 favour drainage in every operation on the abdominal viscera; the remaining 20 do not favour drainage or limit its use to cases where accidental puncture of the viscera has occurred or pus has been free in the abdominal cavity. He also quotes Clark's report on 1,700 laparotomies, which shows that drainage is not only valueless in the majority of cases, but is frequently productive of harm.

In one hundred consecutive laparotomies performed by the writer localised pus was present 36 times, and there was absence of pus in 64 cases. Drainage was employed twice—in a case of suppurating fibroid with appendicitis, and in one of suppurating tuberculous mesenteric glands. In the former case a Mickulicz's gauze-drain was used, in the latter a rubber tube. There were four deaths—one of the two in which drainage was employed, and three of the 98 in which drainage was not employed. The longest period of convalescence was three weeks, most of the cases being sent home on the eighteenth day. There was only one case of hernia, which forms a marked contrast to the writer's experience when drainage was employed. In cases of large pelvic abscess, where the upper wall is composed of agglutinated coils of intestine and plastic exudation, the writer employs vaginal drainage, having primarily closed the abdominal wound.

This paper also deals lightly with a few other points in the technique of abdominal sections, such as the peritoneal toilet and the question of dressings, but its chief concern is the restriction of the employment of drainage in abdominal surgery.

FRANK E. TAYLOR.

REPORTS OF SOCIETIES.

OBSTETRICAL SOCIETY OF LONDON.

Meeting held on Wednesday, December 6th, 1905, W. R. Dakin, M.D., F.R.C.P., *President in the Chair.*

Ventral Fixation of the Uterus and its Alternatives.

Dr. G. Ernest Herman opened a discusion on this subject in a paper which appears as an original article on page 3 of this numbe" of the Journal.

Dr. Horrocks said that he could agree with practically all that Dr. Herman had said. But he considered that this operation was far too often resorted to, partly because sufficient time and skill were not spent in trying to remedy the condition and partly because some men recommended and performed the operation without trying the effect of mechanical support at all. He considered that even when the uterus was well fixed to the abdominal wall it was an unnatural position which was not unattended by danger. Further, sometimes the operation not only failed to cure the patient, but added to the old complaint a pain attributed to the scar and due no doubt to the dragging of the adherent uterus. And, unfortunately, in those cases where, owing to adhesions, the uterus could not be restored and maintained in position by mechanical means, the operation became much more difficult and dangerous. For these reasons, he considered that ventral fixation was an operation only to be resorted to in a few cases when all other means had failed.

Dr. Galabin said that he agreed with a large part of what Dr. Herman had said as to the scope of the operation of ventral fixation. But, personally, he preferred intra-peritoneal shortening of the round ligaments in some of the classes of cases referred to, and particularly where future pregnancies were probable. This operation was not open to the same objections as Alexander's operation, for there is no fear of the round ligaments not being found, of their tearing, or being too weak, or of their nutrition being interfered with. The operator could tell exactly how much shortening was needed, and could discover and deal with unexpected adhesions. He agreed with Dr. Herman that ventral fixation, combined with elytrorrhaphy, was the most effective operation in extreme and obstinate cases of prolapse, but he had known even this to fail, and had found it necessary to remove the whole uterus, at the same time stitching together the broad ligament to form a band across the pelvis. As a preferable alternative to removal of the whole uterus and vagina he suggested Lefort's operation, in which a median septum is made so as to form, artificially, a double vagina. It was a much less severe operation, and he had never met with any case of recurrence of prolapse after it. In cases of retroflexion without much prolapse and without adhesions he thought that skill and perseverance with pessaries would almost always give relief.

Dr. Heywood Smith mentioned that he was the first to perform the operation of ventral fixation.

Dr. Russell Andrews said that so many writers had made no mention of miscarriage and pain during pregnancy that it was difficult to arrive at a just estimate of these disadvantages following on ventral fixation. He thought that the difficulties occurring in subsequent labour had been underestimated by Dr. Herman. Since the publication of his paper on the effects of ventral fixation on subsequent pregnancy and labour, he had come across the record of three cases of intestinal obstruction which seemed to be definitely due to ventral fixation.

Dr. Blacker thought the operation of ventral fixation was a valuable one, but that its indications were limited. He did not recommend it in women who were likely to become pregnant, and had only once performed it in a single woman, a young girl who was suffering from severe prolapse of the uterus, probably of congenital origin. The chief indications for the operation were retroflexion of the uterus with adhesions, and prolapse of the uterus in women at or past the menopause who had to work hard for their living. He had seen considerable pain during pregnancy and secondary uterine inertia, the result of very severe pains in the scar during labour, follow a unilateral shortening of the round ligament in a patient who afterwards became pregnant and had to be delivered with forceps. In cases of prolapse he always did a colpoperineorrhaphy, and he frequently amputated the cervix as well.

Dr. Arnold Lea said that there was a small, though real, danger of intestinal obstruction following the operation of ventral fixation. Persistent abdominal pain and bladder symptoms following the operation were not always due to neurasthenia, but were sometimes the result of extensive adhesions to the abdominal wall. He considered it essential that the fundus should be left free in patients who might subsequently become pregnant. In uncomplicated cases of obstinate retroflexion he gave the preference to intra-peritoneal shortening of the round ligaments.

Dr. Herman, in reply, said he thought that when we found that after the operation delivery took place without difficulty in 94½ per cent. of cases we might safely conclude that the difficulty in the remaining 5½ per cent. was not due to the operation as usually performed, but to some features special to each case, of which an unusual method of operating might be one.

Repeated Tubal Gestation.

Mr. W. Gifford Nash read a short paper, in which he related a case that had been twice successfully operated upon. On the first occasion the left tube was ruptured, and was removed together with the ovary. On the second occasion, two years later, the unruptured right tube and ovary were removed. The symptoms on each occasion were very similar; there were a missed period, pains in the pelvis, vomiting, faintness, uterine hæmmorhage, rectal tenesmus and passage of decidua. The dates of occurrence of the chief symptoms in each attack corresponded very closely. Soon after the onset of symptoms, but before rupture took place, a very perfect cast of the uterus was passed on each occasion. He asked whether it was possible to distinguish casts passed in cases of ectopic gestation from the decidua passed after an early ovum had been cast off from the uterine cavity.

Dr. Cullingworth expressed the opinion that though the passing of a decidual cast from the uterus in a patient with tubal gestation might precede rupture, it should be regarded as evidence that the ovum was dead. Cases in which a cast was passed in the absence of tubal gestation were so rare that the diagnostic value of this occurrence was not appreciably diminished.

Sarcomatous Tissue in the Walls of Ovarian Cysts.

Dr. Frank E. Taylor, in a paper on the above subject, remarked that the development of carcinomatous and sarcomatous tissue in the walls of ovarian cysts, both adenomatous and dermoid, is probably of more common occurrence than is usually believed. But no criteria are available for the determination of the frequency of this condition. He related two cases, and referred to numerous cases recorded by others. Clinically, the sarcomatous change may or may not be indicated by the onset of symptoms, such as abdominal pain, ascites, rapid and irregular growth of the tumour, emaciation and the development of cachexia. Recurrence usually follows ovariotomy in cases of cysto-sarcoma within a very short time, and is singularly confined to the peritoneum. It grows with marked rapidity, and usually causes death within a few weeks, or at most months, after the performance of ovariotomy.

Fibroma of Ovary.

Mr. Alban Doran showed a fibroma of the right ovary which weighed 17 lbs. The patient had been under observation for ten years prior to the operation for its removal. Its presence was associated with ascites and with some adhesions to omentum and bowel. It seemed to have rolled forwards and to the opposite side some years before its removal. No evidence of malignancy could be detected in it.

Fibro-Myoma of Uterus.

Mr. Alban Doran showed a specimen which he had enucleated from the uterus in the second month of pregnancy. The patient went to term. The *liquor amnii* was excessive, and the breech presented. The child was born alive, and weighed 7 lbs.

Tubal Associated with Intra-Uterine Pregnancy.

Dr. Hey Groves showed a ruptured tube removed five weeks after the last regular period. The intra-uterine pregnancy pursued a natural course.

BRITISH GYNÆCOLOGICAL SOCIETY.

Meeting held on December 14th, 1905.

Dr. Richard Smith read notes of a case of Associated Pyosalpinx and Appendicitis, and showed the specimen consisting of a dilated right Fallopian tube with a perforated appendix and small concretion which escaped during operation. There was a history of appendicitis associated with pregnancy five years previously, since which dysmenorrhœa of increasing severity had existed. The patient complained of pain in the right iliac region, increased on movement. The right iliac region was occupied by a hard tender mass extending half way to the umbilicus and down into the pelvis, closely contiguous to the uterus. An incision was made along the right semilunar line. The lower right quadrant of the abdomen contained a mass of inflamed hard tissue with dense adhesions. The tube was dissected out without rupture. Between the appendix and tube an abscess existed containing two or three drachms of pus. The appendix was behind the tumour, and on removing it a perforation was found and near it the concretion. The pus was removed with gauze; no drainage was used. The abdominal wound healed by the tenth day, and convalescence was uneventful.

Mr. Charles Ryall considered the case interesting from the associa-

tion of pregnancy and appendicitis. Adhesions between the appendix and the pelvic organs were fairly common, and he advised a routine examination of the appendix whenever the abdomen was opened.

Dr. C. H. F. Routh mentioned a case under his care where on opening the abdomen an abscess was found on the right side containing fœtid pus and several intestinal sloughs. Next day a slough containing the cæcum was found in the wound. The patient was well in three weeks.

Mr. F. B. Jessett approved of dry swabbing rather than flushing.

Dr. R. T. Smith, in reply to a question, said there was no pyrexia.

Dr. F. Purcell read notes of a case of broad ligament cyst removed by enucleation where the left ureter was injured during operation. Subsequent examination showed a fistula on the anterior surface of the left ureter embedded in cicatricial tissue. The ureter was brought out in the loin as the remaining portion was too short to be implanted in the bladder. The peritoneum was united by a continuous catgut suture and the wall by the method described by Bishop.

In the adjourned discussion on Mr. Smallwood Savage's paper on "Hæmatoma of the Ovary," Professor Taylor said the term lutein cysts had not been applied correctly, as the lutein cells are normally present and not likely to cause these tumours. There are four varieties of these blood tumours—one associated with twisted pedicle and large myomata; another with blood diseases; another with salpingitis where inflammatory adhesions prevent the rupture of the follicles; and the last those described in the paper occurring in strong, well-nourished young or middle-aged women. The prominent symptom is dysmenorrhœa and as the growth increases it causes acute pain always requiring interference. The ovaries are found to be changed into blood sacs with inelastic walls and peculiarly firm adhesions. The contents consist of altered blood being thick and tarry and bacteriologically sterile.

Dr. Hugh Hodgson considered the condition one of physiological excess, and that the rupture of follicles was due to chemical changes.

Mr. F. Bowreman Jessett said that the paper explained some of the causes of ovarian pain.

NORTH OF ENGLAND OBSTETRICAL AND GYNÆCOLOGICAL SOCIETY.

Meeting held at Sheffield, November 17th, 1905, Dr. D. Lloyd-Roberts, *President, in the Chair.*

Dr. J. W. Martin (Sheffield) showed the uterus removed from a patient, aged 54, who had had eleven children and one miscarriage.. The menopause occurred at 46, *i.e.*, eight years ago. One year ago she began to have a thin, inoffensive, blood-stained, watery discharge with no clots. A month before admission she had a flooding, which was followed by pain in the back and lower part of the abdomen. There was no wasting, or any other symptom except lassitude. The vulva and vaginal walls were normal. The cervix was normal, the external os patulous, the internal os closed. The uterus was uniformly enlarged to the size of one three months pregnant; it was firm, elastic and freely movable. The os was dilated, and the body was then discovered to be filled by a loose soft growth, which bled slightly, and which proved on microscopic examination to be myeloid sarcoma. The uterus was removed by abdominal panhysterectomy, and Dr. Martin considered that the adoption of this method was advantageous in allowing

easier manipulation of a portion of the growth, which showed a tendency to invade the bladder. The patient had made a good recovery. Myeloid sarcoma was very rare in the uterus. The question of its malignancy was of interest. Occurring in bone it was the least malignant of sarcomata. Was this the case also in the uterus?

Dr. MARTIN also showed a large fibro-myoma uteri removed from a multipara, aged 44. There was hæmorrhage for one month only previous to operation, and this appeared to be connected with rotation of the uterus, which had also led to considerable degeneration of the myoma.

Mr. ARCHIBALD CUFF (Sheffield) showed bilateral multilocular ovarian cysts removed from a patient, aged 65; also a large ovarian fibroma, part of which was intra-ligamentous. It had extended below the iliac vein. After enucleation it had a distinct pedicle, and as no trace of an ovary could be found the fibroma appeared to be of ovarian rather than of uterine origin.

LITHOPÆDION.

Dr. W. E. FOTHERGILL (Manchester) mentioned a patient, aged 35 years, seen in October, 1904, complaining of pain and tenderness in the left iliac region. Menstruation began at the age of 15, and was regular and painless, occurring every twenty-six days, and lasting from four to seven days. There was occasional slight hæmorrhage. She had been married twelve years, and had twice been pregnant. One year after marriage she had a miscarriage at the second month, and four years later she had a "false" conception, the pregnancy continuing for five months, and ending in July, 1897, with the expulsion of something which she described as a "mole." On abdominal palpation a firm, rounded tumour could be felt through the abdominal wall just above Poupart's ligament on the left side. On bimanual examination the mass was found to be very hard, ovoid in form and about the size of a turkey's egg. It lay to the left and rather in front of the uterus, which was normal in size and position. The left ovary could be felt behind the mass. The right appendages appeared to be normal. On opening the abdomen the corner of the abdominal cavity bounded by abdominal wall, left broad ligament and uterus was found to be roofed in by coils of small intestine which were adherent to the mass below. On separating the adhesions the finger was scratched by the rough hard mass, which was easily dug out. The left ovary was normal. The tube showed no definite sign of having been ruptured, but its surface was roughened by the remains of adhesions separated during the operation. The cavity left oozed a little, but was fairly well covered by peritoneum before closing the abdomen. The patient made a rapid and uneventful recovery. The specimen removed was found to consist of the bones of a fœtus of about five months growth compacted into a rounded mass and to some extent infiltrated with calcareous salts. It was partially covered by a thin more or less calcified membrane. The head was tucked in, the back rounded and the limbs spread over the mass. The ribs, scapulæ, iliac bones and the long bones of the limbs were easily recognised. The patient's husband subsequently supplied the name of the doctor who attended her in her second pregnancy and that of a specialist whom he called in. These gentlemen both remembered the case perfectly. In July, 1897, at the time when the patient said she had expelled a mole, she had serious internal and vaginal hæmorrhage after a period of five months amenorrhœa. Her own attendant diagnosed ectopic pregnancy, and the specialist advised operative interference. After passing a decidual membrane the patient improved in condition, the hæmorrhage ceased, and operative treatment was refused.

Vesicular Mole, Fibroids and Lutein Cysts.

Dr. R. Favell (Sheffield) showed the uterus and appendages removed by abdominal hysterectomy from a woman, aged 46, who weighed over eighteen stones. There had been irregular blood-stained uterine discharges for some weeks, but there was nothing to suggest a diagnosis of pregnancy, and the patient was so fat that examination revealed only an abdominal tumour of considerable size. The specimen removed consisted of the uterus, whose wall contained many small fibromata, and whose cavity contained a large vesicular mole. The cervix was hypertrophied, and was four inches long. Both the ovaries contained small lutein cysts.

Adhesions after Cæsarean Section.

Dr. Favell also mentioned two cases of Cæsarean section. The first was done for acquired atresia of the vagina in a woman who had had a living child two years previously. The vaginal walls were found adherent, so that the remaining canal only admitted a sound. .Nothing could be discovered on enquiry which could explain the condition. The second operation was a Cæsarean section, done for the second time on one patient. Intimate and extensive adhesions were found between the uterus and the abdominal scar.

Dr. A. W. W. Lea described a case of hysterectomy, in which he opened the abdomen on account of persistent pain and discomfort following a Cæsarean section done some years previously. He found the adhesions in the pelvis so extensive that after separating them it was impossible to save the uterus, which was accordingly removed.

Dr. Donald thought it unusual to find adhesions in these circumstances, and that when adhesions were found it indicated that there had been some septic infection during recovery from the first operation.

Dr. Walter had twice done second Cæsarean sections. On the first occasion he found no adhesions; in his second case there were adhesions, but not extensive enough to allow him to open the uterus extra-peritoneally.

Dr. Grimsdale thought that with perfect asepsis it was not the rule to find adhesions after a Cæsarean section. He could not see how anyone could expect to find them large enough to allow of opening into the uterus without opening the peritoneal cavity, for the uterine wound made in a Cæsarean section shrank during involution into a scar an inch or less in length, which it was difficult or impossible to find on opening the abdomen subsequently.

Dr. Croft had twice operated after Cæsarean sections, in one case doing a second Cæsarean. He could not have entered the uterus through the adhesions, and was struck by the apparent absence of any scar. He had further seen an autopsy on an old Cæsarean patient, in whom there was no cicatrix to be seen or any adhesions.

Dr. Gemmell had seen Dr. Wallace repeat Cæsarean section in a case in which he had used every means he could think of on the first occasion to secure adhesions. On again opening the abdomen only a few small filaments were found.

Dr. Martin remarked that he had done the section referred to by Dr. Lea, and that the recovery had been free from anything which could suggest infection, or any other cause of adhesions. It was one of his earlier cases, and was rapidly done with the antiseptic precautions usual at that time. Peritonisation was carefully secured, and the recovery was uneventful.

Dr. CLIFFORD thought that the use of antiseptics during an operation might cause sufficient chemical irritation to cause adhesions. The cases in which no adhesions were found mostly belonged to the aseptic as opposed to the antiseptic period.

OVARIAN PREGNANCY.

Dr. T. B. GRIMSDALE (Liverpool) showed a specimen of undoubted ovarian pregnancy, and described the case; and Dr. CROFT made some remarks on a similar case of his own.

MULTIPLE FIBRO-MYOMA UTERI WITH PREGNANCY. ABDOMINAL HYSTERECTOMY.

Dr. J. E. GEMMELL (Liverpool) mentioned a patient, 36 years of age, seen on April 27th. Ten weeks after marriage her health had been good. She was seized with sudden abdominal pain; vomiting of undigested food, and diarrhœa during the night of April 24th. Next day, the symptoms continuing, an abdominal examination was made. A large tumour was felt, and on pelvic examination the cervix was softened, and the lower segment of the swelling felt soft and cystic. Further, the patient said she had missed her period, and was three weeks past the time; she had had some morning sickness, and there was a darkening of the areola. Operation was performed on May 1st; under the anæsthetic the growth was found to be a large pedunculated fibroid, growing from the upper portion of a multiple fibromatous uterus. The abdominal incision reached from the pubes to a point 1½ inch above the umbilicus, and was accompanied by an outflow of blood-stained serum. The large tumour was attached to the fundus of the uterus by a pedicle 1½ by 1 inch in thickness. The uterus contained several fibroids from the size of an orange (on the right) to that of a walnut, and the uterus was pregnant. Supra-vaginal hysterectomy was performed, and the peritoneum sutured across the pelvis. The uterus contained a six weeks gestation quite complete. The tumour weighed 7 lbs. Convalescence was uninterrupted. On the question of pregnancy and fibroids this case demonstrates that even in the presence of multiple fibromata, and in an elderly primipara, pregnancy can, and does, take place fairly easily, for this patient must have been impregnated about four weeks after marriage. It was impossible to judge of the rapidity of growth, either before or after impregnation, for although, as stated, the abdominal tumour was as large as a seven months pregnancy, neither the patient nor her husband was conscious of the presence of such a tumour until it was pointed out by the doctor.

THE USE OF RUBBER GLOVES IN OPERATING.

Dr. T. B. GRIMSDALE showed composite charts constructed to show the pulse and temperature curves in 120 cases of abdominal section, the operations being "antiseptic" in 40; "aseptic" in 40; and done with rubber gloves in the third series of 40. (See the number of this JOURNAL for December, 1905, page 396, where this paper appears as an original article.

Dr. WALTER asked whether the "glove" series were Dr. Grimsdale's latest cases, the others being earlier in date.

Dr. DONALD noticed that there was as much difference between the respective curves before as there was after the operations. He thought a sufficient number of observations should have been included to secure an identical curve in all the patients before operation.

Dr. FOTHERGILL thought the differences between the curves were so small that the advantages of gloves proved to be too slight to outweigh their disadvantages. He thought, however, that gloves were useful in

dealing with septic cases in order to protect the operator's hands, and thus render him less likely to infect subsequent patients.

Dr. GEMMELL thought that if even a stitch abscess could be prevented by their use, gloves should be worn.

Dr. GRIMSDALE replied that the cases were none of them recent, and that the great labour of constructing the composite curves was the only reason for not using a large series. He thought 40 cases of each kind sufficient to bring out his points.

ROYAL ACADEMY OF MEDICINE IN IRELAND.
SECTION OF OBSTETRICS.

Meeting held on Friday, November 17th, 1905, R. D. PURefoy, F.R.C.S.I., *President, in the Chair.*

The first business of the meeting was the President's Address. It dealt with the early history of the Obstetrical Society, which was inaugurated in November, 1838, under the Presidency of Dr. Evory Kennedy, Master of the Rotunda Hospital. Its meetings were held for nearly twenty-five years in one of the rooms of that Hospital. The objects of the Society were primarily the study and elucidation of obstetrics and gynæcology; further, to investigate the structure and diseases of females and their treatment, the physiology of reproduction, with its comparative anatomy, fœtal structure and physiology, infantile development and disease, and medical jurisprudence. The names of many of the distinguished obstetricians and gynæcologists were recalled, and allusions made to their writings, especially those of Dr. Churchill and Dr. M'Clintock.

THE RESULTS OBTAINED IN THE TREATMENT OF ECLAMPSIA IN THE ROTUNDA HOSPITAL.

Dr. DE LA HARPE, by special permission of the Council, then read a paper on the above subject. He brought forward statistics of the Hospital for the past thirteen years. These have not been published before, and consist of a series of 71 cases treated by morphia injections, and exclusively palliative measures. Twelve died, a percentage of 16·9, results which have never before been approached by any former published statistics of the Hospital. He warmly advocated the more general adoption in practice of the Rotunda methods, which briefly consist of (1) injections of morphia up to 2 grains in 24 hours; (2) thorough lavage of the stomach by means of syphon-tube; (3) purgation by castor oil and croton oil combined, these being passed through the tube before its removal; (4) thorough lavage of the lower bowel; (5) keeping the patient lying on the side to prevent fluids formed in the mouth entering the lungs and causing the so-called œdema of the lungs to occur; (6) poultices to the loins; (7) plenty of saline fluid to be administered through stomach and rectal tubes, or injected beneath the breasts. No operative interference of any kind is considered advisable. Vapour baths and hot packing are not used; neither is nourishment given during the acute stage.*

Sir ARTHUR MACAN said that the treatment by morphia was well known to him, even before Dr. Smyly was Master of the Rotunda. One reason why he did not adopt the morphia treatment was that he was satisfied with the results obtained by the treatment used while he was Master. This

* The full text of this important paper will appear in the February number of this JOURNAL.

was a big turpentine enema, and chloroform to begin with, followed by chloral-hydrate per rectum, as much as 3ii in three or four hours. The sweating treatment was not much used, but since then he had used the hot air bath with very satisfactory results. He thought that the profession almost universally recognised that the termination of labour was a very important point in the treatment, for the use of dilators, Cæsarean section, etc., all pointed to a belief in the efficacy of delivering the woman, and a non-belief in the efficacy of the morphia treatment.

Dr. HORNE said that to compare statistics of twenty-five years ago with statistics of the last ten or fifteen years was very erroneous, owing to the advent of Listerism, by means of which the mortality had been greatly lessened. He would not like it to be laid down that there was any routine treatment for eclampsia. Every case had to be treated on its merits and according to the condition on admission. He related a case which had occurred in the National Maternity Hospital this year, remarkable from the fact that it commenced in the fifth month. He had hoped to learn the cause of the eclampsia, but it was passed over in the paper by saying that it was due to an "auto-intoxication." No special form of treatment could be relied on, and we must be prepared to use morphia, or, in certain cases, Cæsarean section, vaginal section, Bossi's dilator, etc.

Dr. JELLETT said that he would have liked Dr. de la Harpe to go into the question of the operative treatment of eclampsia. He was in thorough accord with Dr. Horne that no fixed line of treatment could be carried through in every case, nor did he believe that any one theory or set of causes would be found which could be laid down as the cause of eclampsia. One class of cases would be found to be due to one set of causes, etc., and treatment could then be classified accordingly. He said he was interested in the radical treatment of eclampsia, principally owing to the fact that he had been represented by Dr. Herman, in a paper read before the Medical Society of London, as having recommended such treatment at a time when he was distinctly opposed to it. Since then, in view of more modern statistics than those quoted by Dr. Herman, he was inclined to look on this treatment with more favour in serious cases. He quoted some of these statistics. He would not argue that radical treatment was the right one to adopt in all cases, but he did think that there were grounds for taking into consideration, and for considering whether, in cases that appeared to be severe, the radical treatment of emptying the uterus should not be adopted from the start.

Dr. HASTINGS TWEEDY said that he considered it a pity that one line of treatment could not be followed, as the cases were few in number. So long as we believed that no hard and fast line of treatment should be followed, we should be working in the dark. No useful statistics could be compiled, and one could not say what was the best line of treatment to adopt. He believed that the infrequency of eclampsia in Dublin was due to the habits of the people. In hot countries people accustomed themselves to very little fluid, but in Ireland the women drank a good deal of tea, etc. As to causation, he did not think that our knowledge of treatment would be much advanced by knowing what the poison was. We had fair grounds for saying it was a toxæmia in the system. We saw lots of toxæmia, which just fell short of eclampsia; headaches, drowsiness, dulness, etc. He considered that the Master of any hospital should be very careful to include in his statistics of eclampsia every form of fit that came in, except epilepsy.

Dr. NEILL said he had seen a good number of cases of eclampsia in the

Coombe Hospital. In one remarkable case the child was lying transversely, and as soon as the malposition was corrected the eclampsia ceased. The other cases were treated with morphia. Some of them were very bad, but all got well. Two or three minims of croton oil, and vapour baths were given in every case.

Dr. Gibbon Fitzgibbon said that one point which had been largely ignored was the question of purgation. It was the treatment adopted in combination with the other palliative measures, and even in those cases where radical treatment was undertaken. In the morphia treatment a large amount of purgation was gone in for. The bowels and stomach were washed out, and sometimes up to seven minims of croton oil were given to clear out the bowels. Sinclair and Johnston reported a series of sixty-three cases occurring from 1847—1854. In those three or four, which were probably epileptic, were included amongst the recoveries. There were thirteen deaths, but a certain number were certainly due to septicæmia. In those cases the treatment practised for the first five years was free venesection, and large enemata and purgatives were also given. In the last two years of that series venesection was continued, but the purgation was left out, and there was a considerably higher death-rate. He thought the question of purgation was a good deal neglected, and deserved more attention than it received.

The President said that he desired to add his quota to the praise already bestowed on the paper which had just been read. It was plain, from a study of the old Master's books in the Rotunda Hospital, that free venesection was the routine treatment of puerperal eclampsia for nearly a century after the opening of the hospital, and in many of the cases, even those admitted in coma, recovery took place. After the discovery of chloroform, it also came into use, sometimes alone, sometimes combined with venesection. Dr. Atthill records an interesting case in which chloroform produced no effect in mitigating the seizures till blood was drawn, and subsequent recovery ensued. In one case of convulsions in a primipara far advanced in pregnancy, he injected chloral subcutaneously, and recovery followed. No method of rapidly emptying the uterus had ever commended itself to him, though he was firmly convinced of the wisdom of expediting delivery by any gentle methods available, such as the use of forceps when the head was easily within reach. He had tried venesection, sometimes alone, sometimes followed by intravenous saline injection, but without success, possibly because the patients were beyond the reach of any treatment.

Dr. de la Harpe replied.

Dr. Tweedy showed the following card specimens:—(*a*) Eleven myomatous uteri removed by abdominal hysterectomy; (*b*) myomata removed from three uteri by abdominal myomectomy; (*c*) one myoma of cervix; (*d*) one cancer of the body of the uterus—Wertheim's operation; (*e*) two cancers of cervix—vaginal hysterectomy; (*f*) one epithelioma of vulva; (*g*) four ovarian cysts; (*h*) two ovarian dermoids; (*i*) one ovarian cancer; (*j*) diseased tubes removed from four patients; (*k*) three pregnancies.

The meeting then adjourned.